Georgia Institute of Technology
School of City and Regional Planning

The Causes and Effects of Environmental Gentrification:

An Examination of the Impacts of the Trinity River Balanced Vision Plan on West Dallas, TX

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Abstract

This paper discusses the concept of environmental gentrification in the context of the Trinity River Balanced Vision Plan in the City of Dallas, which plans to create a sustainable urban park by improving flood control and enhancing the Dallas floodway with recreational amenities and transportation access. A Geographic Information Systems (GIS) analysis of the demographic and property value changes in West Dallas, the area that borders the Dallas floodway, was conducted to detect any signs of gentrification since the adoption of the city's visionary plan for the Trinity River corridor. Although there were some changes detected, there was no sign of any displacement occurring in these neighborhoods yet. The inclusion of a comparative case study of the Los Angeles River Revitalization and Atlanta BeltLine projects provides an illustration of how similar projects have loss affordable housing due to gentrification, as well as the mitigation measures that were taken to address this issue. The result is a review of possible mitigation and prevention strategies for preserving affordable housing during the implementation of sustainability initiatives, followed by the recommended strategies for West Dallas before the execution of the Trinity River Balanced Vision Plan.

Part 1. Introduction

The City of Dallas adopted the 2003 Balanced Vision Plan for the Trinity River floodway, which proposes to create a sustainable park that provides flood protection, habitat preservation, access to transportation, and economic development. The Trinity River floodway is 2,300-acres of barren land with 35-foot levees acting as a barrier to Downtown Dallas, which is located east of the river, and the residential communities located west of the river. The floodway itself separates the neighborhoods of West Dallas from Downtown Dallas. The majority of residents in West Dallas are Hispanic/Latino and Black/African- American, and about 50% of the residents live below the poverty level nearly. In addition, 25% are foreign born and 19% are non U.S. citizens. (Bates and Wiginton, 2008). The plan hopes to revitalize these lower income residential communities adjacent to the Trinity River by offering enhanced transportation access and park enhancements that include recreational fields and lakes. The creation of a park that contains an urban waterfront and recreational amenities will undoubtedly attract the attention of real estate developers. Developer have to "see trends ahead of others or the waves of growth will surpass them"; therefore, the plans to implement enhancements to the river corridor will create a trend "that is magnified by the extent of landholdings in proximity to the river bordering on obsolescence" (Bunster-Ossa et.al, 2010). It becomes harder for existing homeowners and renters to keep up with

this type of growth and accelerated development, which may have severe consequences on the community. The question of whether the implementation of environmental enhancements and amenities, such as the features proposed in the Balanced Vision Plan, will lead to gentrification and the loss of affordable housing within the neighborhoods in West Dallas will be discussed and examined in the following paper. Sustainability initiatives should not undermine the social fabric of a community; rather, it should coincidentally preserve and protect the physical and social environment. The loss of affordable housing is a major consequence of implementing ecological enhancements and environmental amenities; therefore, this issue should be addressed prior to rapid development and real estate market speculation.

It is evident that sustainability will need to be an integral component of planning modern cities. The overview of the evolution of urban parks, flood management, and rapid urbanization in cities within this paper substantiates this notion. The literature review on sustainability and gentrification reveals that there is a paradox that exists between achieving environmental goals and creating equity. An analysis of the economic and demographic changes in West Dallas before and after the creation of the Balanced Vision Plan reveals that there has been an increase in property values in the neighborhoods adjacent to the project. In addition, research on the cases of the Los Angeles River Revitalization and the Atlanta BeltLine projects discovered what the public engagement process was like, if there were any signs gentrification, and what mitigation measures were taken alleviate the impact of these developments for each case. Lastly, this paper will provide different mitigation and prevention strategies that could be generally used by local government agencies and community members to help preserve affordable housing and gain more control of their neighborhoods. The recommendations will provide strategies that are centered around West Dallas and the Trinity River project.

Part 2. Background

The background portion of this paper provides a historical context to subjects relevant to the incorporation of flood management into green spaces, which the Trinity River Project intends to do. The project proposes to transform the river corridor into an urban park that will also improve flood protection for the City of Dallas, in addition to recreational use. In order to understand the function of urban parks and green space planning, the evolution of urban parks will be discussed. Then, the impacts of rapid urbanization on the environment will be reviewed. Lastly, there will be a summary

of the composition of the Trinity River and its history of flood management, along with the history of West Dallas.

2.1. The Evolution of Urban Parks

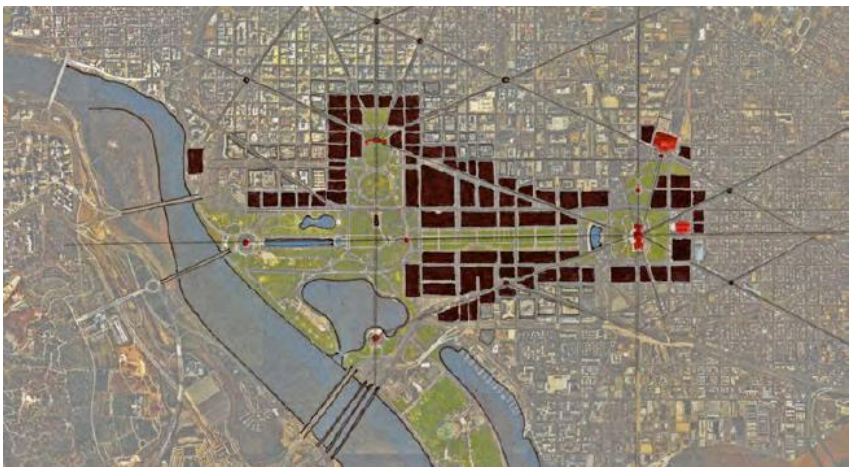
There is evidence that nature in urban areas improve the quality of life and provides social and psychological benefits to humans. The need to experience nature is essential that urban dwellers are allowed refuge from the noise and pollution that occurs in a city. A survey conducted in an urban park in Amsterdam, Netherlands revealed that nature in urban areas create positive feelings that "fulfils important immaterial and non-consumptive human needs" (Chiesura, 2004). It is these social benefits, in addition to the ecological benefits, that make urban parks such a valuable resource and an essential component of sustainability. The incorporation of nature and the creation of greenways within cities has evolved within Western culture. The evolution of urban parks can be classified into three eras: the era of axes, boulevards, and corridors, the era of recreational trails, and the era of multi-functional greenways (Searns, 1995).

2.1.1 Era of axes, boulevards, and corridors

The usage of axes, boulevards, and corridors were commonly utilized in landscape architecture as a way to reintroduce nature into the city and to make the city more beautiful. An axis is a line of direction with defined edges that link important buildings or monuments together; therefore, the primarily purpose of axes are to organize the structure of a city. The utilization of axes can be traced back to the master plan of Rome created by Pope Sixtus V in the 16th century and in the planning of Paris by Baron Eugene Georges Haussmann during the time of 1853 to 1868 (Gaston, 2005). During the Renaissance, axes and boulevards were created to connect the palace gardens, churches, and other public buildings in the city. In addition, corridors were created along natural features such as rivers and man-made features like canals to provide walkways and space for commuting (Searns, 1995). The goal of greenways in this era was to provide connectivity and a linear path for residents, while at the same time bringing the beauty of nature to the city. At the end of the 19th century and beginning of the 20th century, the City Beautiful Movement brought the Baroque style of using axes and boulevards into the United States. Frederick Law Olmsted and Daniel Burnham are the most well-known architects and planners from this movement. Olmsted introduced the concept of bringing nature into the city and the

preservation of open space through urban containment with the creation of Central Park in New York City. In Washington D.C., Burnham incorporated axes and boulevards throughout the city to link the national monuments. The rendering of Washington D.C. in Figure 1 shows how the axes connect the U.S. Capital Building with other significant monuments. This era lasted until around 1960, as the normalization of automobiles reshaped the structure of cities and shifted the main function of urban greenways towards more recreational use.

Figure 1. Rendering of Axes in Washington D.C.



Source: Nashville Civic Design Center/ Drawing by Gary Gaston

2.1.2 Era of recreational trails

The era of recreational trails began around 1960 and lasted until 1985, as a result of the increase amount of motorized vehicles used in urban and suburban areas. The actual term 'greenway' was first used in the book *The Last Landscape*, written by William H. Whyte in the late 1960s (Searns, 1995). In this book, Whyte indicated that there were many strips of unused land that already existed in metropolitan areas and that this land could be linked together to create greenways. The phrase greenway was officially used by a government agency to describe linear parks in the plan of Santa Clara County, California during the mid-1960s. Also, greenway was officially used during the development of the Platte River Greenway in Denver, Colorado in the 1970s (Searns, 1995). During the 1970s and 1980s, urban trails become more popular for biking and hiking because the population were more aware of environmental issues due to the environmental movement during the 1960s and

1970s (Searns, 1995). Overall, recreational trails became more desirable to U.S. citizens due to the increase in automobile usage and environmental awareness made

2.1.3 Era of multi-functional greenways

In this era, there is a shift towards using greenways and urban parks for multiple purposes such as "habitat protection, flood hazard reduction, water quality, historic preservation, education, interpretation, and other purposes" (Searns, 1995). The previous eras treated green spaces more as amenities and aesthetic enhancements to the city. The era of multi-functional greenways began around 1985 and is the current era of today. The Clean Water Act of 1972, along with the amendments of 1977 and 1987, required municipalities to be more proactive in ensuring the integrity of their hydrological systems and to monitor water quality. It is this era that corridors and greenways began to become viewed more as green infrastructure that could address issues like water quality, erosion control and flood protection (Searns, 1995).

2.2 Urban Flood Control

The risk of flooding has increased in urban areas due to rapid population growth. There are currently more people living in urban areas than in rural areas; in addition, it has been projected that 66% of the world's population will be living in an urban area and adding about 2.5 billion people to the world's urban population by 2050 (United Nations Department of Economic and Social Affairs, 2014). Metropolitan cities will need to increase development to accommodate these new additional residents, which is also known as urbanization. Urbanization entails the removal of vegetation and deforestation, which results in an increase of impervious surface and causes "an altered hydrograph with high peak flows [1] and reduced base flows[2] on stream hydrology" (Bernhardt & Palmer, 2007). In addition, impervious surfaces reduce soil infiltration[3] and evapotranspiration[4], while increasing storm runoff in an area. An abundance of storm runoff decreases groundwater recharge and contributes to flooding by modifying the natural processes of groundwater and surface water systems. Riparian vegetation and wetlands protect land from erosion, maintains water quality, preserves aquatic life, and acts as flood mitigation (Winter, Harvey, Franke & Alley, 1998). The

[1] The time it takes for a river to reach its highest flow.
[2] The flow of the river during dry weather. It is not caused by runoff, but rather from water seeping from the ground.
[3] The entering of water into soil
[4] The process of water is being transferred from land into the atmosphere by evaporation from the soil and the transpiration from plants.

storm water drainage system in urban areas intensifies the high peak flows of stream channels (Bernhardt & Palmer, 2007). As flooding becomes a bigger threat to cities due to urbanization, there will be an increase demand for sustainable development.

The Dallas Floodway Project is one of the main initiatives of the Trinity River Corridor Project, which will provide flood protection by creating a chain of wetlands to restore the river's hydrological system. This project includes ecological enhancements such as the "restoration of channel meanders and morphologically diverse channel geometry, establishment of a diverse native riparian plant assemblage, and construction of three lakes in the floodway adjacent to the river channel" (City of Dallas, 2009). As previously mentioned, the function of green spaces and urban parks have evolved to include flood mitigation; therefore, there is a significant relationship between flood control and ecological preservation when it comes to sustainable development in cities. The creation of wetlands and vegetation provides ecological services that include "dilution of wastewater, natural purification of water, erosion control, and habitat for fish and wildlife" (Loomis, Kent, Strange, Fausch, & Covich, 2000).

2.2.1 Dilution of wastewater

Sufficient river flows helps to dilute pesticides released from agriculture, the wastewater discharged from treatment plants, and the contaminants in storm water runoff (Loomis, Kent, Strange, Fausch, & Covich, 2000). This dilution is necessary to ensure water quality in streams. The restoration of wetlands is an efficient way to preserve biodiversity and to improve water quality as they can absorb up to 96% of nitrogen and 97% of phosphorous (Bolund & Hunhammar, 1999).

2.2.2 Natural purification

Wetlands and riparian vegetation naturally purifies water that contains pollutants from urban storm water runoff or pesticides from agricultural practices. These pollutants are absorbed by plants and broken down by bacteria; therefore, any pollutants attached to sediment will also be filtered by vegetation and will be deposited into floodplains (Loomis, Kent, Strange, Fausch, & Covich, 2000).

2.2.3 Erosion control

The roots of vegetation provide erosion control in stream banks by preventing excess movement of soil throughout the ground. Inadequate vegetation along streams allows the rain to wash soil from the surrounding areas into the river. This soil fills up the river's floor with mud and makes the river shallower, which is detrimental to the health of fish and wildlife (Loomis, Kent, Strange, Fausch, & Covich, 2000).

2.2.4 Fish & Wildlife Habitat

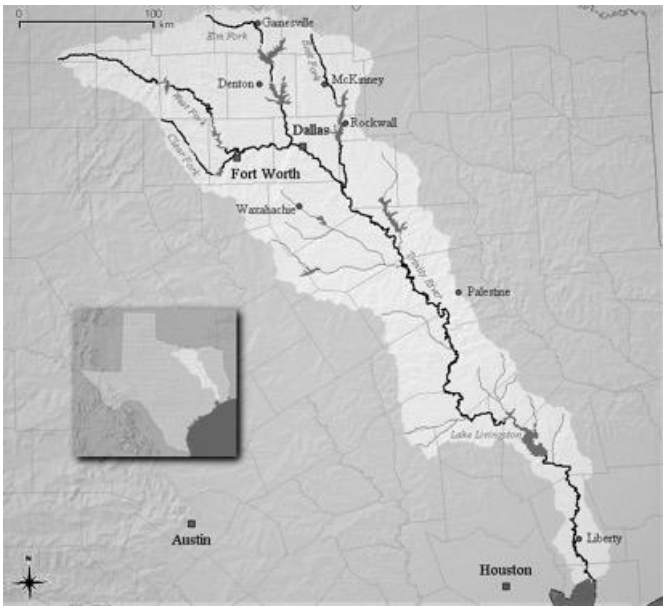
Wetlands and vegetation along rivers supports a wide range of wildlife species such as woodpeckers, ducks, shorebirds and deer. The vegetation prevents algae growth, which is detrimental to aquatic life. In addition, it provides shelter and a place to nest for many bird species. (Loomis, Kent, Strange, Fausch, & Covich, 2000).

2.3. The Trinity River

2.3.1 Composition

There are three main branches of the Trinity River: the East Fork, the Elm Fork, and the West Fork. The East Fork flows south for 78 miles through the counties of Collin, Rockwall, Dallas, and Kaufman before it joins with the West Fork. The West Fork branch of the Trinity River flows southeast for 180 miles through the counties of Jack, Wise, Tarrant, Dallas, and along the county boundaries of Ellis and Kaufman counties before joining with the East Fork. The Elm Fork flows southeast for 85 miles through Cooke and Denton counties before it connects with the West Fork, which then flows west of Downtown Dallas (Gard, 2010). The Balanced Vision Plan's project location takes place in the Elm Fork, which runs along downtown Dallas after the convergence of the West and Elm forks. Then, the Trinity River flows southeast for 423 miles towards the coast and drains into the Trinity Bay near the City of Houston. The Trinity Bay is the northeastern portion of the Galveston Bay. The map of the Trinity River Basin can be seen in Figure 2, which also shows the main forks of the river (Polk, 2016).

Figure 2. Map of the Trinity River Basin



Source: D Magazine "The Trinity Project: Characteristics of a River"

2.3.2 Past Flooding

The annual rainfall in the Trinity River watershed ranges from thirty to forty inches in the upper portion of the basin and forty to fifty inches in the lower portion of the basin. The immense amount of storm water runoff created during thunderstorms causes frequent flash floods near the upper section of the river, while the middle and lower portions tend to experience gradual flooding (Gard, 2010). One of the most destructive floods on record was the flood of 1908, which killed 11 people and caused about 4,000 residents to flee their homes (Furlong, Ajemian, & McPherson, 2003). During the flood, the river basin received about ten to fifteen inches of rain throughout a three-day period. Figure 3 shows that the flood height had reached to 52.6 feet during the flood of 1908, along with the flood heights of prior floods in Dallas. The damage caused in West and Downtown Dallas from the flood of 1908 cost about $2.5 million, and is still considered the largest flood ever recorded in Dallas (Furlong, Ajemian, & McPherson, 2003).

Figure 3: Trinity River Historical Flood Heights

Year	Gage Height at Commerce Street
1822	"Big Flood" of Indian Legend
1841	(Dallas settled.)
1844	50.7 feet
1866	49.2 feet
1871	47.4 feet
1890	45.4 feet
1908	52.6 feet

Source: Furlong, Ajemian, & McPherson. *History of the Dallas Floodway*
Original Source: Engineering News-Record; November 21, 1929

2.3.3 History of Flood Management

Years: 1911 to 1926

The landscape architect, George E. Kessler, came up with a plan for the City of Dallas in 1911 that proposed a levee system to help prevent floods in the Trinity River floodway. The Kessler Plan was revised in 1919 to include recommendations to widen the levees of the Proposed Dallas Floodway from 1,200 feet to 2,000 feet and to raise the height from 25 feet to 30 feet (Furlong, Ajemian, & McPherson, 2003). In addition to levees, the Kessler Plan recommended the creation of two parkways, a set of boulevards, and five additional parks (Furlong, Ajemian, & McPherson, 2003). In 1919, the Dallas County Levee Improvement District Number 5 was created to manage the areas adjacent and upstream of the Elm Fork and West Fork of the Trinity River. In 1926, the Dallas County Levee Improvement District Number 10, also known as the Levee District, was created to handle the area downstream from the junction of the Elm Fork and West Fork of the Trinity River. Later in that same year, the Joint Plan of Reclamation reclaimed 7,217 acres of land for the Levee District and 3,336 acres of land for the Dallas County Levee Improvement District Number 5. The plan had reclaimed a total of 10,553 acres along the Trinity River (Furlong, Ajemian, & McPherson, 2003).

Years: 1928- 1942

In 1928, the Dallas Floodway Construction was known at this time as the second largest project in the country with a total cost estimated at $14 million. The project included the "relocation of utilities, streetcars, telegraph poles, oil and gas lines, water lines and sewer lines" and moved "22 million cubic yards of dirt to

relocate the river one-half mile west into the middle of the floodplain and to build up the levees" (Furlong, Ajemian, & McPherson, 2003). It took 700 days to complete this project with the employment of about 400 workers in the field. The stock market crash of 1929 and the Great Depression in 1930s prevented the city to sufficiently operate and maintain the levee systems that were constructed during the Dallas Floodway Construction. As a result, there was still a problem with flooding drainage. In 1942, the Trinity River experienced an 111,000 cubic feet per second peak discharge[5]. The real estate developer, John Stemmons, began to focus his efforts to improve the levees along the Trinity River floodplain after this flood in 1942 (Furlong, Ajemian, & McPherson, 2003).

Years: 1942-1968

John Stemmons led the efforts to get the State legislature to establish the Dallas County Flood Control District, which would receive $25,000 in annual state taxes, collected within the district's boundaries to help pay for the operation and maintenance of the levees(Furlong, Ajemian, & McPherson, 2003). The Fort Worth District of the U.S. Army Corps of Engineers began reconstruction of the Dallas Floodway in 1953, which included the creation of new pump stations and a new pressure sewer system in the Turtle Creek neighborhood. The project also moved an existing pressure sewer outlet 100 feet west away from Cadiz Street Bridge, which is now Interstate Highway 35. The width of the Dallas Floodway was reduced to 30 feet during this project along with the construction of levees that spanned 22.6 miles. The project was completed in 1960 and costed about $8.3 million (Furlong, Ajemian, & McPherson, 2003).

Years: 1968-1983

The U.S. Representative James M. Collins, whose term was from 1968 to 1983, supported the development of a park within the floodway of the Trinity River. He recommended to John Stemmons that 4,000 acres of the floodway should become a park. The Congressman was able to allocate $2,235,187 of the U.S. Housing and

[5] The unit for the flow of water, the volume of one cubic foot flowing during one second.

Urban Development (HUD) federal funds to acquire land between the levees (Furlong, Ajemian, & McPherson, 2003).

Years: 1989- Present

After the city experienced floods in 1989 and 1990, the City of Dallas began working with the Corps to improve the floodway with the Dallas Floodway Extension (DFE) Project in 2001.The purpose of the DFE project is to reduce flooding and to restore the ecosystem of the river; it entails the construction of a chain of wetlands, the Cadillac Heights and Lamar Levees, and the implementation of recreational enhancements downstream of the existing Dallas Floodway(Furlong, Ajemian, & McPherson, 2003). The chain of wetlands in this project contains two sections: the Upper Chain of Wetlands and the Lower Chain of Wetlands. The purpose of these two wetlands is to reduce flood levels by at least four feet in the Trinity River corridor with a series of connected ponds that will discharge treated water from the Central Wastewater Treatment Plant (City of Dallas, 2009). The Lower Chain of wetlands is already complete, but the Upper Chain of wetlands is currently still being constructed.

In addition to the DFE, the USACE will be working on the Dallas Floodway Project as it is proposed in the Balanced Vision Plan. As of 2015, the Final Environmental Impact Statement and Final Feasibility Report had been completed. The next steps for this project were reported to be the acquisition of additional federal funding and the appropriate permits for construction. In addition, the review of construction designs (Loxley, 2015). Overall, the Dallas Floodway Project incorporates the chain of wetlands created in the DFE along with the creation of recreational amenities such as multi-trails, pedestrian bridges, access points for canoeing, parking facilities, and other amenities that are associated with passive recreational-use (City of Dallas, 2009).Figure 4 shows a rendering of the design of the Dallas Floodway Project.

Figure 4. Rendering of Trinity River Corridor Design (2009)

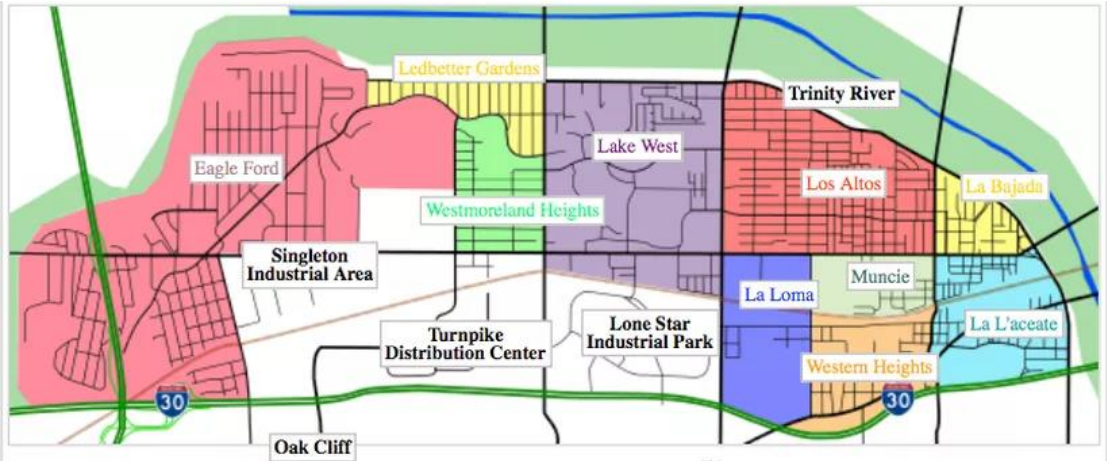
Source: City of Dallas Balanced Vision Plan- The Trinity River Corridor Design Guidelines

2.4 West Dallas

2.4.1. Segregation

The housing in West Dallas was racially segregated after its annexation into the City of Dallas in 1950. The Dallas Housing Authority (DHA) built 4,500 housing units in 1955, which was racially segregated with "1,500 units for whites, 1,500 units for blacks, and 1,500 units for Hispanics" (Rodeheaver and Cutrer, 1995). This housing projects were built on 465 acres of land located south of the Trinity River. Figure 5 shows the various neighborhoods that reside within West Dallas and how it is adjacent to the Trinity River. The area experienced further segregation in 1957, when the DHA began to move Hispanics away to new housing projects and continued to move more Black people into West Dallas. The West Dallas Housing projects were 90% Black by 1974, as housing was being assigned by race and ethnicity (Rodeheaver and Cutrer, 1995). In 2012, it was reported that West Dallas consisted of "more than 26,000 people, mostly Latinos and Blacks, with a per capita income of just over $12,000, roughly half the figure citywide" (Appleton, 2012).

Figure 5. West Dallas Neighborhoods



Source: West Dallas Chamber of Commerce

2.4.2 Inadequate Housing

As previously mentioned, the DHA constructed housing units during the early 1950s. Urban Renewal programs were being implemented throughout all of the major cities in U.S. at this time, in an attempt to remove neighborhoods that municipalities deemed as 'slums'. The housing units that the DHA built replaced existing 'slums' located in West Dallas. The city had reported that "Dallas slums and the blighted areas in which they lay were a definite danger to health and social and economic welfare" (Dallas Housing Authority, 2012). After decades of housing segregation and neglect, six Black women residents of West Dallas filed a lawsuit against the HUD and the DHA in 1985 (Rodeheaver and Cutrer, 1995). They argued that the poor Black families were forced to live in slums due to its conditions. The lawsuit was settled in 1987, which required the renovation of 832 apartments. After the settlement, the remaining apartments that were not renovated were demolished and there were many families that left West Dallas (Rodeheaver and Cutrer, 1995). Figure 6 shows an example of what the housing projects looked like, this particular photograph is the neighborhood of Lake West in 1981.

Figure 6. Housing Projects in Lake West, West Dallas (1981)

Source: The Dallas Morning News/ Photograph Taken By Jay Godwin

The City of Dallas was sued in 1988 for violating the 1987 settlement made with HUD and DHA by working with the DHA to further create "separate and unequal system of public housing" (Rodeheaver and Cutrer, 1995). As a result, the city spent about $118 million on increasing low-income housing, improving the conditions of these housing developments, and implementing fair housing laws in 1990 (Rodeheaver and Cutrer, 1995). At around this time during the 1980s, a federal judge called for the demolishment of housing projects in West Dallas. The judge expressed how these housing projects were a "gigantic monument to segregation and neglect" (Hacker, 2017). The city then replaced these housing units with subsidized apartments, townhouses, and about 50- single family homes (Hacker, 2017). Figure 7 shows the new DHA housing units called the Hamptons at Lake West at the top of the photograph and the old housing units on the bottom of the photograph in the neighborhood of Lake West in 1998.

Figure 7. The Hamptons at Lake West (1998)

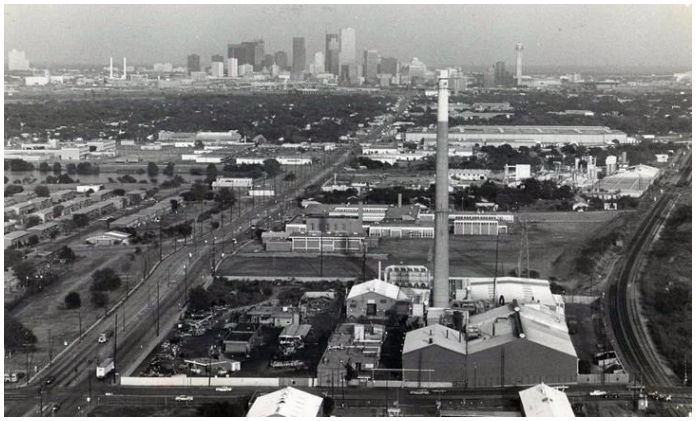
Source: The Dallas Morning News/ Photograph Taken By Richard Michael Pruitt

2.4.3 Lead Contamination

In addition to discriminatory housing, the residents of West Dallas have experienced lead contamination. The Center for Disease Control and Prevention (CDC) conducted a 10-year study on the effects of lead exposure in the late 1960s and early 1970s. At this time, many children in the U.S. were experiencing high levels of lead in their blood due to lead paint within households. The City of Dallas participated in this study and discovered that many children in West Dallas had high blood lead levels in 1972, so the city repainted the houses within the housing projects in West Dallas the following year (Rodeheaver and Cutrer, 1995). The Environmental Protection Agency (EPA) administered a series of studies throughout the country to establish air quality standards in the 1970s and 1980s. In 1981, the study exposed that close proximity to lead smelters caused high concentrations of lead in both soil and dust in Dallas (Rodeheaver and Cutrer, 1995). RSR was the smelting plant located in West Dallas, which had violated EPA ambient air quality standards for lead twice. As a result, the City of Dallas and the state of Texas sued RSR in 1983 (Rodeheaver and Cutrer, 1995). The photograph in Figure 8 shows the proximity of the RSR plant to the West Dallas neighborhoods. The plant eventually was closed in 1984 after the plant was sold to another corporation. After the plant closed, the city continued to monitor the blood lead levels in West Dallas by testing the blood of children under the age of 7 from 1991 to 1994.

The EPA classified some areas of West Dallas as a Superfund[6] site (Rodeheaver and Cutrer, 1995).

Figure 8. The RSR plant smokestack in West Dallas (1981)



Source: The Dallas Morning News/ Photograph Taken By Jay Godwin

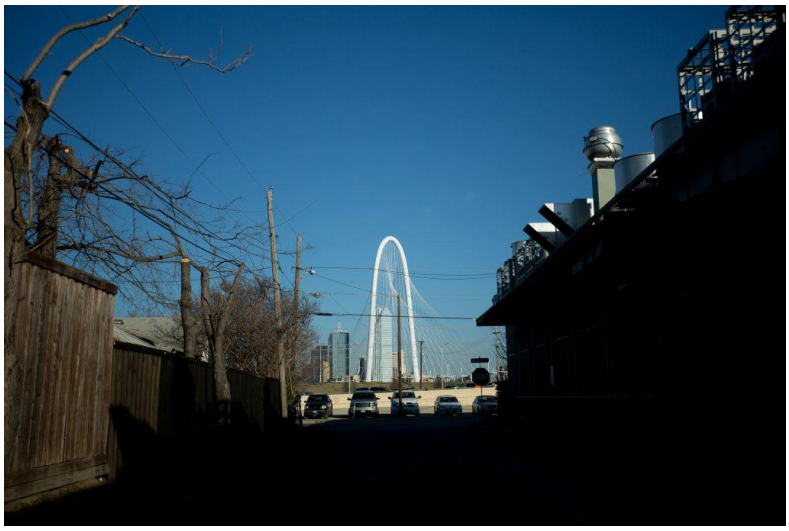
2.4.4 Trinity Groves

The Trinity Groves is a commercial development located in the most eastern portion of West Dallas, closer to Downtown Dallas. This certain development is referred to as a restaurant incubator that contains restaurants, dessert shops, and a brewery. The Trinity Groves was created by three developers who worked together to form the West Dallas Investments LLC. The land acquisition for this development began in 2005 and by 2010 sixty acres of land was acquired; however, the initiative to create Trinity Groves did not occur until 2011 (ULI, 2016). In addition to the restaurant incubator, there are plans to include mixed-use urban redevelopment near the Trinity Groves. One of the founders of the West Dallas Investments LLC, Phil Romano, believes that the new development has been good for West Dallas because it has significantly cleaned up the area. He expressed his vision to make Trinity Groves the "recognizable destination in Dallas" (Collins, 2017). Following the development of the Trinity Groves, the Margaret Hunt Hill Bridge was built in 2012. The bridge is the first of three bridges that are going to be built as a part of the Balanced Trinity River Plan. The view of the Margaret Hunt Hill Bridge from a West Dallas neighborhood can be seen in Figure 9. The new development has some benefits like

[6] A contaminated site that will be cleaned up by EPA funds

infrastructure improvements and an economic development, but the prices of homes have also skyrocketed. The West Dallas Investments LLC paid about $2.50 per square foot for the land acquired in the 2005; however, they paid over $30 per square foot in 2016 (ULI, 2016).

Figure 9. The View of the Margaret Hunt Hill Bridge from a West Dallas Neighborhood (2017)



Source: KERA News/ Photograph Taken By Allison V. Smith

2.4.5 Lack of Affordable Housing

There are many residents of West Dallas that lived in HMK Limited (Ltd.) homes, which were affordable rental homes that had a minimum rent of $300 per month. The city deemed that the HMK Ltd. housing was not in compliance, so the landlord decided to close down 305 rental homes (Collins, 2017). The tenants of these homes would have had to move out and find other affordable housing to live in; however, there is already a shortage of affordable housing in Dallas. According to the National Low Income Housing Coalition, only "19 affordable homes are available for every 100 low-income families who need a place to live" (Collins, 2017). The homes in West Dallas are currently being built for $350,000 in areas where the rent used to range from $500 to $600 a year ago, according to the Dallas Area Habitat for Humanity (Collins, 2017).

Many of the tenants ended up not having to leave, as the landlord of HMK Ltd. allowed the tenants to buy their homes in June 2017. The tenants that bought their homes

entered into a 20-year loan agreement, where there was no down payment and the mortgages would be about $575 a month. The mortgages included a special warranty deed and a deed of trust (Fernandez, 2017). The Los Altos Neighborhood Association plans on helping these families with home repairs in the future. Fortunately, these tenants were able to stay in their homes; however, they will now be responsible for maintaining their homes and paying property taxes. The property taxes will be based off the real property value that their property would sell, which will be a lot higher than before due to the new development occurring in West Dallas. There is still no known solution to the displacement of families and individuals who have lived in affordable housing for so long in places like West Dallas. The decrease of affordable housing in U.S. cities has made the displacement even more problematic, as there are not many places to where low-income families can move to.

Part 3. Literature Review

Many cities throughout the country have embraced the concept of sustainability and have made efforts to include sustainable developments into their plans. The Trinity River Corridor Project is an example of a large metropolitan area taking initiatives to be more sustainable. The project's purpose is to "leave the city more resilient and better equipped to protect air quality, water quality, energy use, wildlife, and the land by implementing sustainable projects" (City of Dallas, 2009). In order to better understand the possible social and economic consequences of implementing sustainable parks, this literature review will discuss topics related to the concepts of sustainability and environmental justice. The specific topics that will be reviewed are social sustainability, the equity principles for sustainable development, social vulnerability, and environmental gentrification. The purpose of this review is to provide an insight into the conflicts between environmental, social, and economic factors that persists in sustainable development.

3.1 Social Sustainability

One of the most well-known definitions of sustainability was defined in the Brundtland Report, officially titled *Our Common Future, as* "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987). In addition to distributing resources equitably between present and future generations, the concept addresses the ability to sustain the scale of the economy with respect to its ecological system and to efficiently

allocate resources while taking the natural capital into account (Costanza & Patten, 1995). Sustainable development addresses the economic growth and environmental aspects of sustainability, but has traditionally neglected to address the social justice and equity issues that can occur in communities. As a result, the concept of social sustainability has been discussed in literature as a response of this negligence.

Social sustainability emphasizes the importance of the involvement of local communities in sustainable development by promoting social inclusion and cohesion. There have been three approaches to social sustainability discussed in research: development sustainability, bridge sustainability, and maintenance sustainability. In this approach, development sustainability addresses basic needs and focuses on social justice and equity. The argument is that developed countries have still not been able to resolve issues such as poverty, inequity, malnutrition, unemployment, and inadequate housing. The emphasis is on first meeting the basic needs for everyone, which then will be followed by positive improvements in the physical environment (Vallance, Perkins & Dixon, 2011). Bridge sustainability is more concerned with changing behaviors in order to achieve sustainable goals by 'bridging' or connecting people to their physical environment. The main strategy for this method is to "identify the social conditions necessary to support ecological sustainability" (Chiu, 2003). In order to create this connection with the environment, there would need to be more incorporation of different subjects such as psychology, human geography, socio-ecological studies, and environmental sociology (Foladori, 2005). Maintenance sustainability involves sustaining the socio-cultural customs along with the environment over time; the ability to preserve the environment while still maintaining the quality of life that people want. (Vallance, Perkins & Dixon, 2011). The three main concepts under social sustainability either focuses on what people need, what is good for the environment, or what people want.

Social sustainability implies that sustainability has traditionally relied heavily on the scientific and technological aspects. Literature on social sustainability has discussed about the need for "a two-way dialogue of metaphors, stories, or symbols that resonate with our everyday individual and collective experiences" (Vallance, Perkins & Dixon, 2011). The increase of public participation in development would consists of stakeholder empowerment, social cohesion, and consensus building. Perhaps the incorporation of individuals' experiences integrated with scientific and technological tools will result in better a decision-making that is more fair and just for the collective.

3.2 The Equity Principles for Sustainable Development

The struggle between economic development, environmental protection, and equity has been one of the major conflicts within sustainable development. The Brundtland Commission had asserted that economic development was necessary to achieve the social goals of sustainable development (WCED, 1987). However, many have argued that economic development has exasperated the deterioration of the natural environment within urban areas. As a result, there has been five equity principles identified within the analysis of sustainable development: intergenerational equity, intra-generational equity, geographical equity, procedural equity, and inter-species equity (Haughton, 1999).

These five principles were established to provide some kind of framework for environmental justice within the concept of sustainable development. The principle of intergenerational equity aligns with the Brundtland Commission's definition of sustainable development, which was to not compromise the future generation's ability to meet their needs (WCED,1987). Intra-generational equity focuses social injustice and the redistribution of resources. This principle is concerned with equity for people within the same generation in the present time (Haughton, 1999). Geographical equity, also known as transfrontier responsibility, insists on the importance of creating local policies that also addresses global environmental problems. Local governments tend to only focus on protecting the local economic and environmental system, without taking into account the impacts of their decisions on a larger scale (Haughton, 1999). The fourth principle is procedural equity, which addresses regulatory and participatory systems. These systems should ensure that all people are being treated openly and fairly. In order to achieve this, it has been suggested that "all people should have access at different points into public decision-making" (Haughton, 1999). Lastly, inter-species equity acknowledges the inherent rights of other species and the importance of their survival to maintain biodiversity within the ecosystem. The argument is that nature has an intrinsic right and that humans have a responsibility to ensure the survival of other living species and the overall ecosystem (Haughton, 1999).

3.3 Social Vulnerability

As cities experience the effects of climate change and the stresses from rapid population growth, their vulnerability to disasters has increased as well. It is "population growth, composition and distribution [that] are perhaps the most important factors that have increased our vulnerability to disasters" (Donner & Rodríguez, 2008). The distribution of the environmental risks and hazards

associated with natural disasters are disproportionately experienced by the most vulnerable communities within cities (Jabareen, 2013). This inequality experienced by vulnerable people suggests that social conditions of an environment must be considered, along with the diversity of those who live in that environment. There has been more consideration for the changing demographic patterns and its influence on disaster vulnerability in literature. The demographic changes and population growth in the U.S. has resulted in greater amounts of people being vulnerable to disasters such as hurricanes and floods (Donner & Rodríguez, 2008).

Social vulnerability addresses how the most vulnerable people living in cities are at the most risk for being most affected by natural disasters and environmental hazards. The most vulnerable people in cities are those "whose capacities and freedom to act are normally limited or deliberately suppressed" (Hewitt, 2013). In a capitalist society, those who lack monetary and social capital have less opportunities and choices in housing and employment. Research on the topography of poverty has revealed that concentrations of poverty are corresponded with areas of either high or low elevation, such as mountains, valleys, floodplains, and deltas (Holt, 2007). As a result, vulnerable people are situated in areas that are most prone to environmental disasters. It is known that low-income minority households bear the brunt of flooding damage. The senior research associate at the Center for Urban and Regional Studies at the University of North Carolina at Chapel Hill, James C. Fraser, interviewed Federal Emergency Management Agency (FEMA) officials and discovered that they were somewhat aware that social vulnerability significantly coincides with flooding disasters (Fraser, 2006). In addition, low-income households usually live in inadequate housing that was poorly built or live in mobile and modular homes. After Hurricane Andrew, an analysis revealed that a mobile home was "21 times more likely to be destroyed than a conventional home" (Morrow, 1999). These households also tend to lack the supplies and materials needed for the aftermath of a natural disaster. There is also a large disparity during an aftermath of a natural disaster, as it is mostly low-paying jobs that are lost due to the closure of businesses after a disaster (Morrow, 1999).

Many members of urban communities automatically have a higher risk to natural disasters due to their demographic, health, and socioeconomic status. In every society, there are individuals and groups of people that are less affluent and marginalized. It is these groups of people that are most vulnerable to the effects of climate change; therefore, social vulnerability is thus a justification for equity and social justice locally and internationally (Jabareen, 2013). The victims of the 2004 tsunami in the Indian Ocean is an example of those who are globally vulnerable to natural disasters, as the majority of the victims were women (Hewitt, 2013). As women living in developing nations, these

individuals had pre-existing disadvantages in comparison to women who lived in developed nations. In general, women living in poverty are at higher risk during floods, even their race and ethnicity may increase the risk of losses during a flood." (Donner & Rodríguez, 2008). The 2050 Census projections show that the United States will experience an increase in population by 44 percent, for which immigration will be a catalyst for this rapid growth (Donner & Rodríguez, 2008). Immigrants are less likely to seek help when they are at risk because of fear of deportation. In Florida during Hurricane Andrew, many immigrants did not trust the relief workers due to this fear. The distrust of government officials during natural disasters may be due to practices such as pre-screening citizenship of hurricane evacuees by U.S. Customs and border patrol agents (Donner & Rodríguez, 2008). In addition to the disadvantages affiliated with race, gender, and class, factors such as health and age determines an individual's vulnerability to disasters. The elderly may not be able to effectively respond to disaster or may suffer more due health-related problems during a disaster, especially those who are economically disadvantaged (Morrow, 1999). The increase of vulnerable communities living within cities have made the relationship between vulnerability and disasters an important discussion within the city planning academia.

There have been countless studies on environmental racism, but there have been mixed results. The studies that do not find any evidence of environmental racism "use smaller population units in the analysis than those that do find evidence for environmental injustice/racism"; however, there has been evidence that mainstream environmentalists have had "little interest in issues faced by poor, minority, urban people"(Benton, 2002). Some have argued this is due to environmentalists' attitude towards cities in general and not because of racism. Either way, the vulnerable communities in urban areas has been neglected for a long time by the environmental movement. There are some who argue that environmentalists should join civil right activists because "changes in behavior required of almost all people for environmental reasons need widespread cooperation" and " most people on earth are non-white" (Westra & Wenz, 1995). This notion argues that environmentalists should be advocates for inclusion and equity, as it will take the majority of humans to change human consumption patterns and habits. In order to respect and value the environment, humans must concurrently respect and value all people.

The research on social vulnerability reveals the importance of assessing pre-existing vulnerabilities within the development process to minimize risks and prevent major losses associated with disasters. In order to achieve environmental equity, development must avoid risks and "against redistribution of risks where some may benefit, but others are worse off" (Hewitt, 2013). In many

cases, the addition of ecological enhancements may "perpetuate or exacerbate conditions of vulnerability" in populations that are already vulnerable (Dooling, 2012). For example, the creation of public green spaces in Seattle led to a no-sitting and anti-camping ordinances during the 1990s, in an attempt to deter homeless people from parks. These ordinances criminalized the homeless population and reinforced their already existing vulnerable conditions (Dooling, 2012). Although there is not a natural disaster in this scenario, there is still a connection between social vulnerability and sustainable development. Green spaces provide ecological benefits, but still have unforeseen consequences for vulnerable communities. It is an environmental paradox that the people most vulnerable to natural disasters are also the most negatively impacted by environmental interventions that were meant to protect or benefit them.

3.4 Environmental Gentrification

As previously mentioned, vulnerable people living in cities are more susceptible to environmental risks and hazards; in addition to this, they also do not equally receive the distribution of benefits associated with ecological enhancements. Environmental gentrification, also known as ecological gentrification, addresses this uneven distribution of benefits and the displacement of people as a consequence to environmental planning efforts. In an attempt to enhance the ecological function of a city, green spaces " operate as a gentrifying process for the most vulnerable users" and "the benefits associated with green space designation are distributed unevenly" (Dooling, 2012).

There have been many studies that identified urban parks as the cause of gentrification by unintentionally raising the values of real estate; however, most literature on environmental justice had tended to focus on the distribution of environmental benefits and the exposure to environmental hazards, instead of displacement caused by increased real estate values (Kwon, Han & Park, 2017). Many environmentalists try to achieve equity by leading efforts to reinvest in areas that have been traditionally neglected and exposed to environmental hazards, but developers intervene in these efforts and tend to benefit the most from the development of environmental enhancements (Curran & Hamilton, 2012). The social injustice that was previously addressed and to have thought to been resolved, has only evolved into another injustice called environmental gentrification. Recently, there have been more studies interested in gentrification and how urban parks contributes to gentrification. Environmental gentrification is the result of sustainability policies that indistinguishably integrate environmental amenities to economic growth, which threatens to displace low-income and vulnerable people (Curran & Hamilton, 2012). The most well-known

example of ecological gentrification would be the High Line Park in New York City, where the New York City Economic Development Corporation reported that nearby property values had increased 103% between 2003 to 2011 (Wolch, Byrne, & Newell, 2014). The High Line has become inaccessible to low-income residents and the rapid increase in property values resulted in "countless small businesses and low-income residents based around the High Line to move out" (Kwon, Han & Park, 2017).

Most green spaces and urban parks are considered a public good as it provides open space to residents for free, so the private properties located nearby would have rent reflecting the value of this park (Correll, Lillydahl, & Singell, 1978). A study conducted in Boulder, Colorado evaluated the distance and the property values of residential properties located near a greenbelt. The results showed that the distance to the greenbelt did have a significant on property values (Correll, Lillydahl, & Singell, 1978). Other studies have also had similar results, a significant increase in sales price when properties are directly adjacent to greenspaces. The properties that were located near the entrance to a green space saw a decrease in sales price due to more exposure to the public. Properties that had a view of the greenspace, but were not adjacent to it, did not experience a significant rise in sales value (Nicholls & Crompton, 2005). The results of another study conducted in Los Angeles, just north of the University of Southern California, showed a positive significant impact to house values that were within a 200 to 300 feet ring from the greens space. If there was a "1% increase in the amount of green space within the 200 to 300 ft ring", this increase "would lead to an approximate increase of 0.07% in the expected sales price of the house"(Conway, Li, Wolch, Kahle, & Jerrett, 2010).

If green spaces results in the increase of property values, this means that the property taxes will increase as well. There may be residents who do not want to sell their property and now have the burden of paying higher taxes. There are public benefits from the increase property tax revenue as the money goes to the county, the school district and other special districts that may benefit the overall neighborhood (Correll, Lillydahl, & Singell, 1978). In the Furuseth and Altman study on greenways, they described the users of the Capital Area Greenway System trails in Raleigh, North Carolina as elite with an income above average. The study concluded that "greenways do not serve the entire community, but neighborhoods" and that "planning and development of new greenways should be pursued with this in mind" (Lindsey , Maraj & Kuan, 2001)." Cities are made up of diverse neighborhoods, so if only a few neighborhoods are being served than this would be considered a social injustice. Even if there are greenways within lower-income minority

neighborhoods, there tends to be less access in their section of the greenway. For example, a study on the Chicago River Corridor discovered that there was "lower vegetation quality, poor maintenance, and less access than sections adjacent to higher-income white neighborhoods" (Lindsey , Maraj & Kuan, 2001).

Part 4. Analysis

An analysis using Geographic Information Systems (GIS) was conducted to examine the demographic and property value changes that have occurred in the neighborhoods located in West Dallas. The Trinity River's Balanced Vision Plan of 2003 intentionally wanted to increase nearby property values and development in the West Dallas area by improving flood protection and environmental restoration. The first GIS analysis looks at the median rent and median family income of West Dallas that was reported in the 2000 Census before the creation of the Balanced Vision Plan. Next, I compared the tax value assessments for the year of 2010 and the year of 2015. Finally, I analyzed demographic shifts by comparing the Census 2000 demographic profile and the Census 2010 demographic profile in West Dallas.

4.1 Methodology

4.1.1 Data Collection

U.S. Census Bureau Census 2000

The Summary File 3 (SF 3) from the 2000 Census Bureau included the following tracts: the Vehicles, Housing Unit Characteristics Tract, the Rent, Housing Unit Value Tract, and the Income, Poverty Tract. The median rent asked information from the Vehicles, Housing Unit Characteristics Tract was compared with the median family income from the Income, Poverty Tract. The median value of owner-occupied housing units from the Rent, Housing Unit Value Tract was also compared with the median household income data. The value in this dataset represents the respondent's estimate of how much the property would sell. Value is the respondent's estimate of how much the property would sell for. In addition, the 2000 Census provided an excel spreadsheet of the Population and Households, which was used to look at the demographic profile of the area.

U.S. Census Bureau Census 2010

The 2010 Census Demographic Profile Summary File contains data on the demographics of the population within each tract surrounding West Dallas in 2010. The following races were included in the analysis: Black/African American, Hispanic/Latino, White, and Asian. The data was compared to the demographics of population living in within the same tracts in 2000.

City of Dallas GIS

The GIS Department of the City of Dallas had data on the Tax Values of residential properties in 2010. The tax data were collected from the County Appraisal Districts, which is updated once a year. The accuracy of these data is not guaranteed by the city, but it is meant to only provide an overview of the value of the properties of parcels in 2010.

Dallas Central Appraisal District GIS

There was a limitation in that there was no available data that had the same parcel-by-parcel tax value information available for the years after 2010. The Dallas Central Appraisal District provided Tax Parcel Neighborhood data which contained the 2015 current assessed value of neighborhoods within Dallas. These values would naturally have larger dollar amounts as it represents the collective values of neighborhoods, while the 2010 data have individual parcel data. The neighborhoods used in this dataset were organized by the properties that had similar characteristics, so the results still came out displaying the similar natural breaks as in the parcel-by-parcel data to this grouping.

4.1.2 Spatial Mapping

The housing and income from the 2000 Census Bureau data were mapped out to analyze whether the housing in West Dallas was more affordable before the 2003 Balanced Vision Plan for the Trinity River. In order to this, the median household income was symbolized the affordability of housing used to be in 2000 before the Balanced Vision's initiatives began in 2003. The shapefile that contained the median asked rent was symbolized to show the quantities in graduated color. The data was classified by natural breaks, which showed the natural groupings inherent in the data. The quantities of the median family income was symbolized as graduated symbols, specifically as dots on top of the median asked rent information. In addition, a second map was created to compare the

value of owner-occupied housing units was also symbolized as a graduated color in comparison to the median family income. The purpose of these two maps are to see whether the property owners and renters within these tracts in 2000 had an income that matched the median asked rent and value of housing units; therefore, it should give an insight on the overall affordability of housing at this time.

After looking at the affordability of the housing in 2000, the demographics changes from 2000 to 2010 were examined to see whether there were any signs of displacement. In each tract, there contains a pie chart that contains four colors representing four different races. The color that is the most dominant represents the largest amount of people that identified as that particular race in that the particular year. Please note that this does not represent the amount of individuals living within the tract, just the most prevalent race represented within that tract.

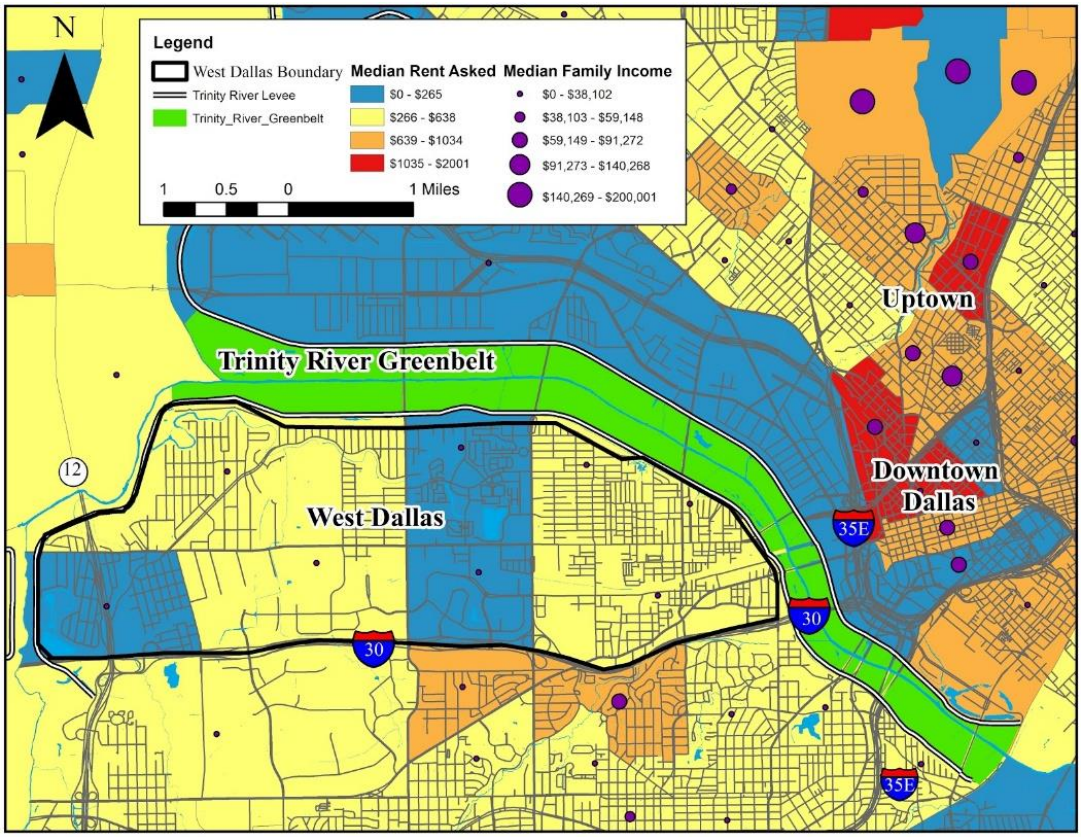
As previously mentioned, there were some limitations in collecting data for the analysis of the tax values of properties. The scale of the data for 2010 and 2015 are different, as the data in 2015 represent the tax values of neighborhoods. The shapefile used for 2010 contained all the parcels, so the residential properties had to extract from the original dataset. The dollars amount of the 2015 data are significantly higher than the results from the 2010 data, with the highest amount reaching a little over $1 billion. The data were classified using natural breaks, which means that the data for each year dataset were distributed at naturally occurring groups within the date. The groups consist of values that are similar and the breaks occurs where there are big differences. The data were mapped out in separate layouts, so for this reason the maps will be separately analyzed and not directly compared. The parcel information still provides an overview of where the lowest and highest tax valued properties are located and the same goes for the neighborhood values as well. It can still give an insight of what properties are more valuable in comparison with the nearby properties at that time.

4.2 Results

The maps created from the 2000 Census Bureau housing and population information reveals that both median rent asked and the value of owner-occupied housing units was more affordable in comparison with the median family income. In Figure 10, the tracts within the West Dallas boundary are the colors yellow and blue, which are the lowest range of rent prices. The blue represents a monthly rent of $265 and below, while the yellow represents a monthly rent between $266 and $636. . The smallest dots represent those families with the lowest incomes, which resides

in tracts that also have the lowest rent prices. The biggest dot located near West Dallas resides within an orange tract area, which represents a mid-range of rent prices. All of the dots within West Dallas are the same size, which means the median annual family incomes within West Dallas equal to and is less than $38,102.

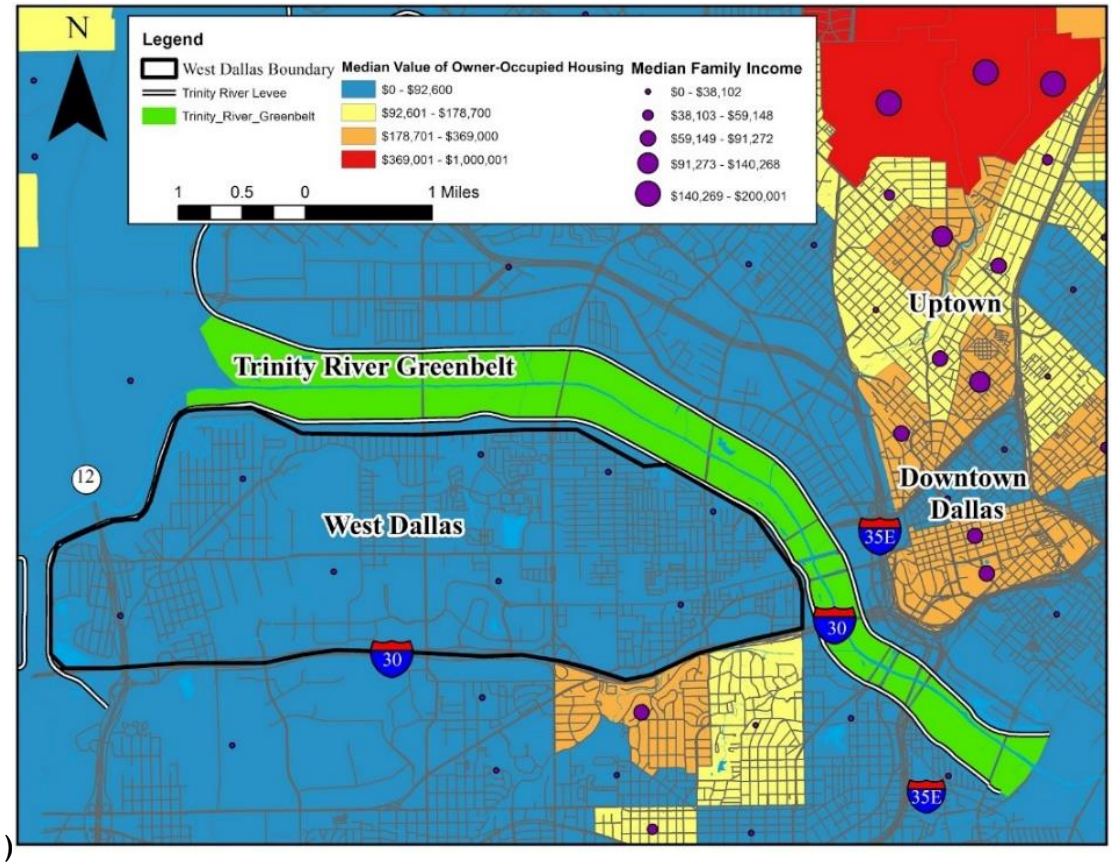
Figure 10. Comparison of Median Family Income with Median Rent Asked in West Dallas, TX (2000)



Source: U.S. Census Bureau (2000)

The value of median owner-occupied housing units was also compared with the median family income. Figure 11 shows that the price of housing units was all in the lowest price range at $92,600 and below. Once again the biggest dot in the area is located in an orange area representing the mid-range of an amount of $178,701 and $369,000. The results of these two maps show that the effects of living near the Trinity River in 2000 did not have any significant impacts on the prices on property and rent in West Dallas. The development of Trinity Groves had not yet been created and the initiatives from the Trinity River Balanced Vision had not begun at this time.

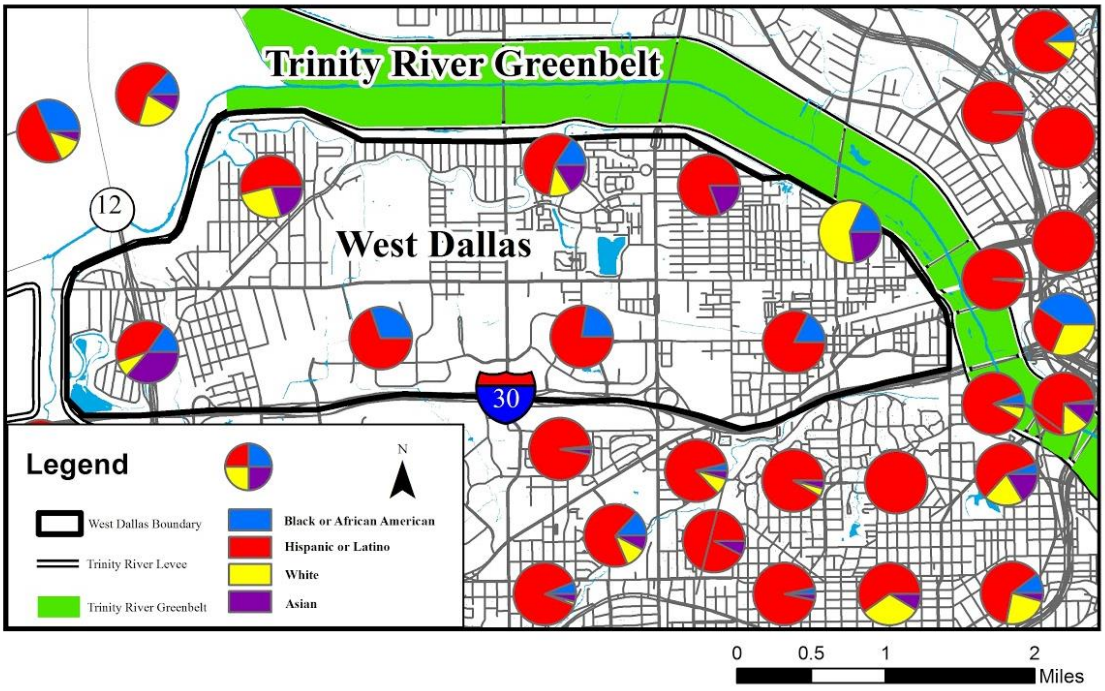
Figure 11. Comparison of Median Family Income with Value Owner-Occupied Housing Units in West Dallas, TX (2000)



Source: U.S. Census Bureau (2010)

Figures 12.1 and 12. 2 show the demographic changes between 2000 and 2010 in West Dallas. The color blue represents Black/African-American people, yellow represents White people, red represents Hispanic and Latino people, and purple represents Asian people. At first glance, the demographics of those in West Dallas and the neighborhoods surrounding the Trinity River is red in 2000, which represents the Hispanic/ Latino population. There are a few tracts that are predominantly blue or yellow as well, but the red is undeniably the most prevalent. In comparison, the dominant colors seen in the 2010 map is yellow and red. The yellow has significantly increased since 2000, but the red is still a predominant color in the surrounding areas of West Dallas. It also seems that in some tracts that were previously dominantly red are now predominantly blue and the presence of purple has significantly decreased in 2010 in comparison in 2000.

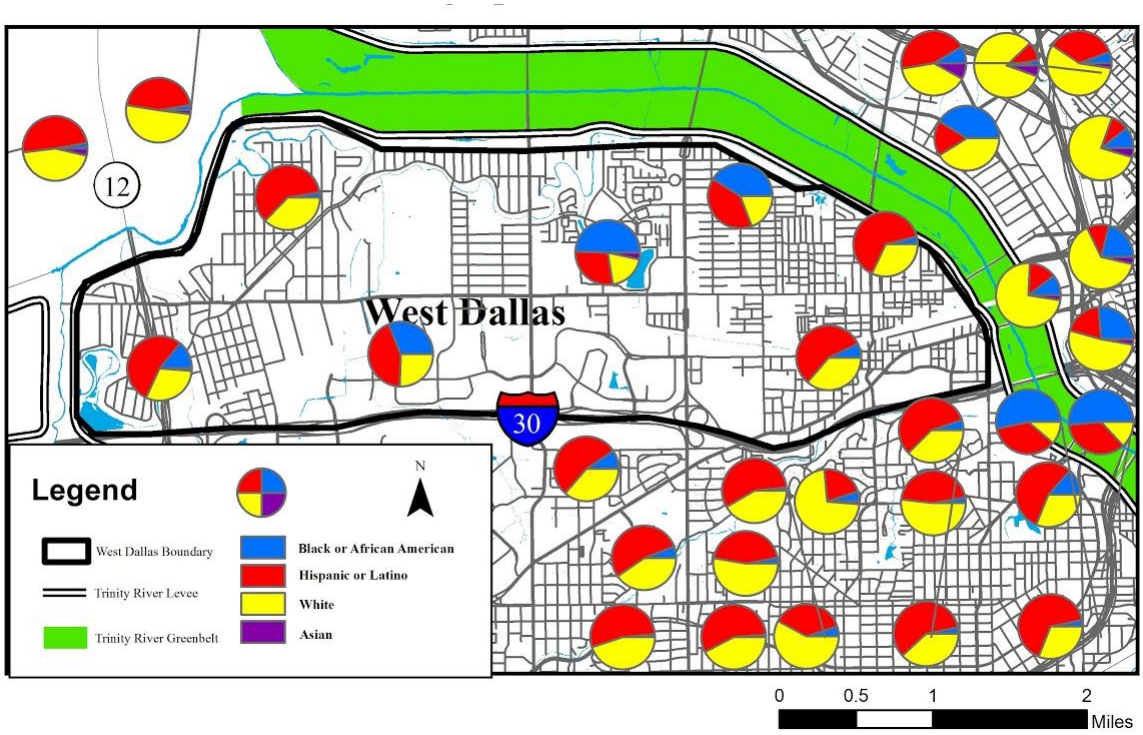
Figure 12.1. Demographic Changes in West Dallas, TX (2000)



Source: U.S. Census Bureau (2000)

These results show that West Dallas remained to have a strong minority presence in both 2000 and 2010, but there is a stronger presence of White people living in the surrounding neighborhoods in 2010. This may be due to the general increase of people moving back to urban areas, as many White people that had previously moved to suburbs have begun to move back to cities. Downtown Dallas, which is the area east of the Trinity River, has significantly become more yellow in 2010 in comparison to 2000. There has not been any dramatic signs of displacement based off the data of 2000 and 2010, but there is a sign that there is growing increase of White people moving in the area. The next Census will be conducted in 2020, it will be interesting to see whether this pattern will continue.

Figure 12.2: Demographic Changes in West Dallas (2010)

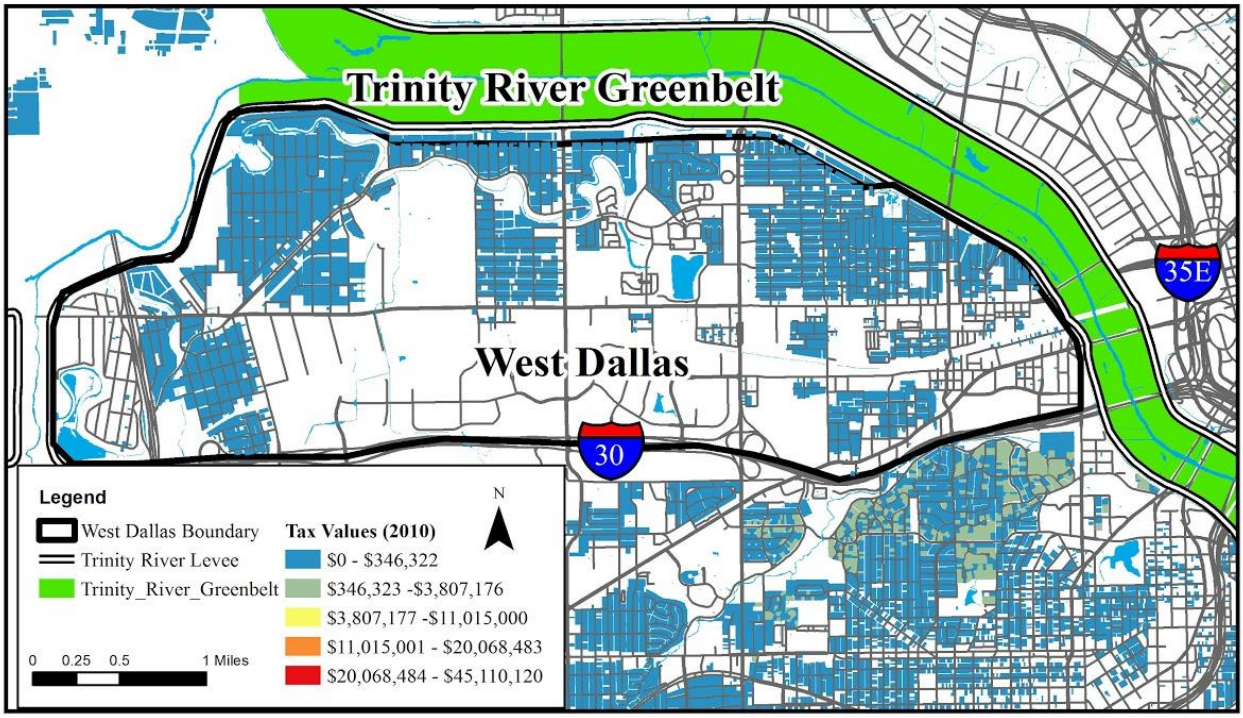


Source: U.S. Census Bureau (2010)

The parcel tax values shown in Figure 13 cannot be directly compared as they both represent a different kind of data; however, where the parcel and neighborhood ranks in comparison with the other properties in the data can be compared. The map showing the 2010 parcel tax value information shows that the parcels within the West Dallas Boundary are ranked the lowest, which is represented by the blue color. The blue color represents properties that were assessed to be valued at $346,322 and lower. This is consistent with results in Figure 11, which showed that the median value of owner-occupied housing units in the same area was also all blue and the lowest value in 2000. However, the highest median value of owner-occupied housing units in 2000 was $92,600. The values used in the dataset from Figure 11 represents what the property owners estimation of how much their property would sell, while Figure 13 shows the appraised values of properties conducted by the county. It is unclear whether increase in values are due to overall inflation in the last decade or the gap between perception and actual appraisal of property values. The higher values properties represented as green in 2010 are located south of West Dallas boundary. Figure 12 shows

that the same area south of West Dallas had a higher presence of White people than the area within West Dallas boundary.

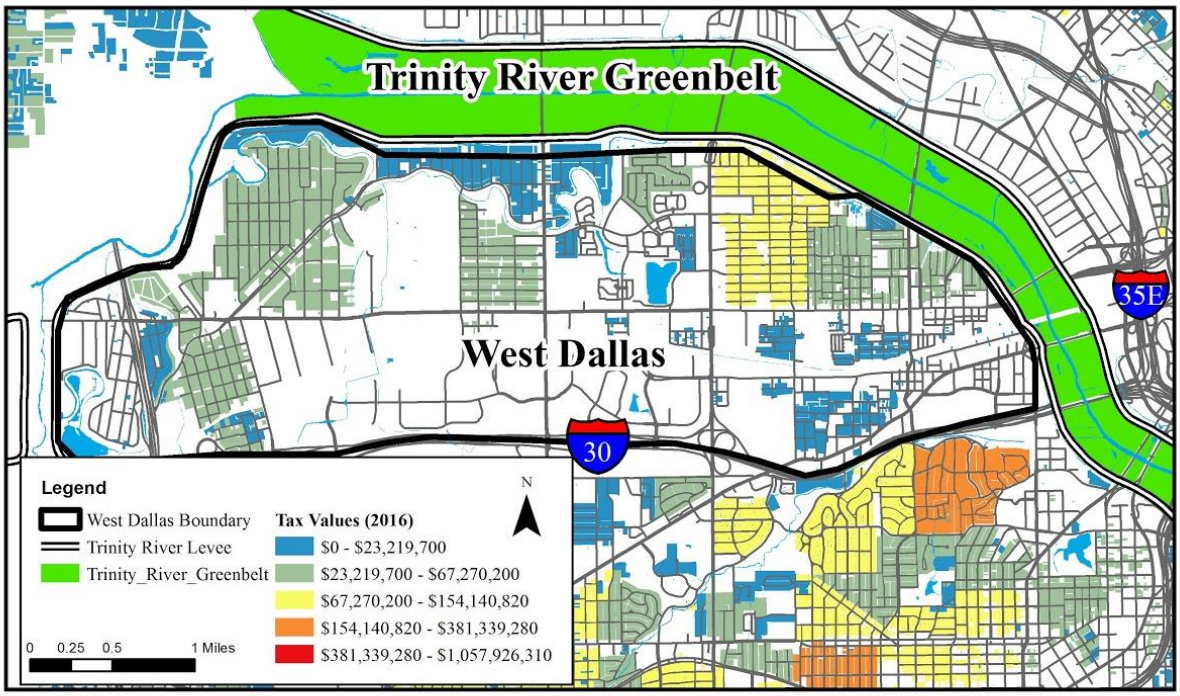
Figure 13. Parcel Tax Values in West Dallas, TX (2010)



Source: City of Dallas GIS

The neighborhood tax values for 2015 in Figure 14 reveals that neighborhoods near the Trinity River are still in the mid-range prices. There are no properties that were categorized as red, as the highest property valued neighborhoods were located in uptown, north of Downtown Dallas. Once again, the areas with the highest property values near the Trinity River is south of West Dallas boundary. The new development occurring in West Dallas may have caused this increase in property values in this area. The white space in the eastern portion of the West Dallas boundary represents the commercial properties of the Trinity Groves, perhaps the proximity to this development and distance from the rest of West Dallas made this specific area have higher property values.

Figure 14. Neighborhood Tax Values in West Dallas, TX (2015)



Source: Dallas Central Appraisal District

Overall, the results show that there has been some change in demographics and demographics in the neighborhoods surrounding the Trinity River. The neighborhoods within the West Dallas Boundary still has a large population of minorities that include Black/African-Americans and Hispanic/Latinos. The results show that there are more White people living in West Dallas in 2010 than in 2000 and that the property value has risen since 2000. Although the property values have increased in West Dallas, the property there is still valued lower than the nearby properties located south of West Dallas near the Trinity River. It could be a possible sign of encroachment that may gradually result in displacement, but it seems that as of 2015 there has not been full displacement of the original residents in West Dallas. The city is still implementing the Dallas Flood Project from the Balanced Vision Plan, so there may have been drastic changes that have occurred between 2015 and now or will occur in the future.

Part 5. Case Studies

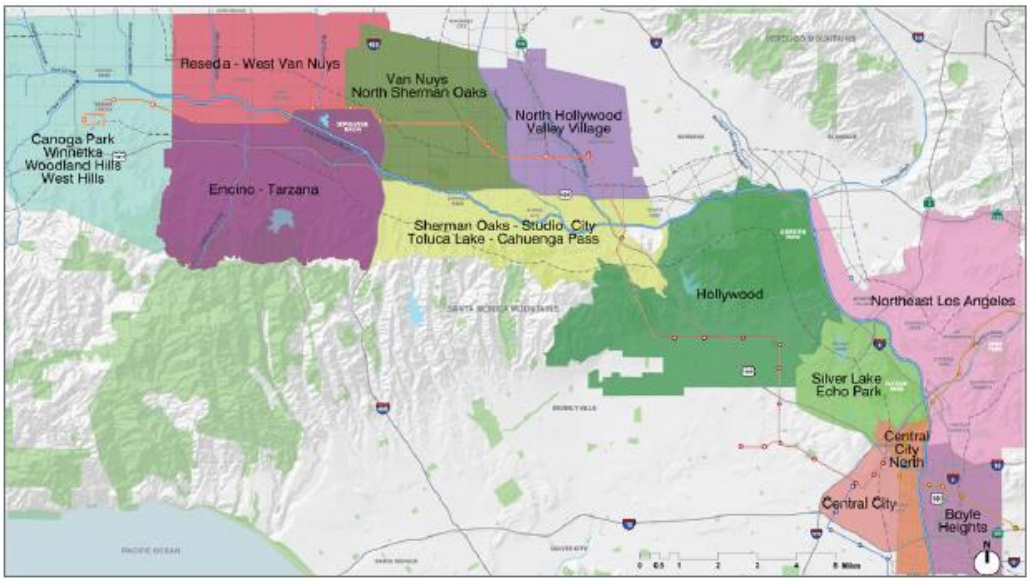
A review of two similar cases will help to provide a better understanding of the phenomenon of environmental gentrification and how other municipalities have responded to this problem. The Los Angeles River Revitalization and Atlanta BeltLine projects have both increased the property values of the nearby housing. The lack of affordable housing is an issue in large metropolitan cities, but the implementation of sustainable green infrastructure like a multi-trail or green space along a river may only intensify gentrification in urban areas already experiencing an increase of population. This section will discuss the public engagement conducted during the planning process and the mitigation strategies that were created to address gentrification.

5.1 Los Angeles River Revitalization

5.1.1 Project Overview

In 2007, the Los Angeles River Revitalization Master Plan (LARRMP) proposed to revitalize the Los Angeles (LA) River corridor by including enhancements such as parks, pedestrian and bicycle trails, bridges, and modifications to the channel (LADWP, 2007). The plan is similar to the Trinity River restoration project in that it intends to improve flood protection and water quality by creating wetlands, while also providing economic development and recreational amenities to the city. Figure 15 shows the different neighborhoods that are adjacent to the 32- mile long LA River corridor, each of these neighborhoods had updated their community plans to include the LARRMP. The LARRMP was structured under four categories: the "physical modifications to the River channel, open space development, multi-purpose revitalization in twenty opportunity areas—with five described in greater detail—and River Corridor governance and management" (LADWP, 2007, p. 4).

Figure 15. Neighborhoods Adjacent to the LA River Corridor Revitalization Area



Source: Los Angeles River Revitalization master Plan: Community Planning Framework (2007)

5.1.2 Public Engagement

Prior to the implementation of the LARRMP, there was an extensive public and stakeholder engagement process that included stakeholders committees, such as the Stakeholder Committee, Advisor Committee, and the Peer Review Committee (LARRMP, 2007). There were 20 public meetings that consisted of a presentation about the project and workshops that had participants provide their input with comment forms and project boards. Public engagement was incorporated throughout the planning process to include the public's vision and suggestions for design elements and modifications for the river channel (LARRMP, 2007). It was reported that there were about a total of 788 comments received by September 2006, the majority of the comments addressed the recreational aspects and the restoration aspects of the project (LARRMP, 2007).

5.1.3 Gentrification

There is a total population of one million residents living along the LA River corridor. The median household income amongst this population is $45,179 and 18% of these residents live in poverty (Alvarado, et al., 2016). There negative impacts of the revitalization of the river includes the loss lack of affordable housing for low-income

residents (LADWP, 2007). There was already a shortage of affordable housing and multi-family housing in the city prior to this project, so the project has exacerbated these existing conditions in these neighborhoods. In addition, the existing properties along the LA river corridor significantly increased. For example, the neighborhood called Elysian Valley in Northeast LA (displayed as pink in Figure 15) has a large amount of Hispanic/Latino and Asian residents living there. The median price of a house in Elysian Valley, had increased by 21% in 2015. Overall, the median house prices had increased about 16% throughout the Los Angeles County in that same year (Alvarado, et al., 2016).

5.1.4 Mitigation Efforts

The City of Los Angeles addressed the potential impacts of gentrification on low-income residents and other vulnerable populations living along the LA River corridor in the LRRMP. The plan suggests that there should be the development of ordinances "that require some amount of the property value increase that occurs because of rezoning to be applied to support the inclusion of existing residents and businesses in redevelopment" (LARRMP, 2007, p.20). It then explains how there has already been "resort communities" that have established ordinances that helps to slow down the pace of gentrification. The *Findings and Statement of Overriding Considerations* portion of the LRRMP mentions the "displacement of affordable housing units and minority or low-income residences" are negative impacts that would require mitigation (LADWP, 2007, p. 40). The River Revitalization Corporation (RRC) has stated that it will work with the city to address the lack of affordable housing. Their goals are to attain a percentage of the funding used for new housing to be set-aside for residents in need and to ensure that a percentage of the property-owners of these new homes will meet an Area Median Income (AMI) target defined by the RRC based on the local market (LARRMP, 2007).

5.2 Atlanta BeltLine

5.2.1 Project Overview

The Atlanta BeltLine originated from a thesis written by a Georgia Tech student named Ryan Gravel, which proposed using existing rail track easements to create a multi-trail around the City of Atlanta. Gravel called for the integration of transportation, land use, greenspace, and sustainable growth. The Atlanta BeltLine is a planned loop that will

comprise of 33-miles of multi-use trails, about 2,000 acres of green space, and accompanied by 22-miles of the Atlanta Streetcar. Currently, the Atlanta BeltLine consists of four completed trails with two trails still under construction (Atlanta BeltLine, n.d.). It has been implemented through a public-private partnership and is managed by the non-profit organization called Atlanta BeltLine, Inc. (ABI). The main goals of the BeltLine project is to create Transit Oriented Development (TOD), increase park and open spaces, and to expand the region's transportation network with the streetcar and multi-use trails with (Atlanta BeltLine, n.d.). The project is expected to be fully complete by 2030.

5.2.2. Public Engagement

During the planning process in 2007, there were 184 public meetings conducted that presented to the public the details about the BeltLine and allowed for public feedback about the then proposed project. There were 10 Neighborhood Planning Units (NPU) that each had their own meeting as well (Atlanta BeltLine, 2013). In addition to public meetings, there were online surveys and interviews given to stakeholders for feedback and opportunities to answer questions about the project. The online surveys were effective in capturing the feedback of hundreds of people (Atlanta BeltLine, 2013).

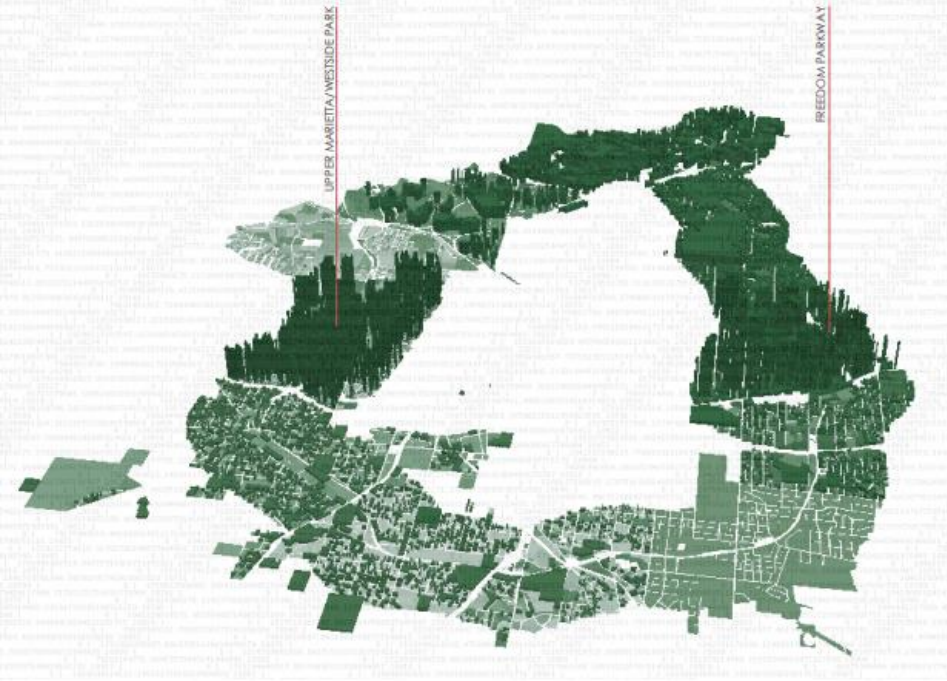
5.2.3. Gentrification

The effects of gentrification can be found within half of a mile from the BeltLine, where property values have risen between 17.9% and 26.6% in comparison to other homes in the region. The highest increases in median house sale prices are located in the southwestern portion of the BeltLine, which rose 68% from 2011 to 2015 (HJL & R|A, 2017). The southeastern and northwestern portions only rose about 40% and the northwestern portion rose about 51% during the same time (HJL & R|A, 2017). The southwestern portion has a high population of Black/African-Americans living there. Figure 16 shows a visual of property values in sales surrounding the BeltLine in the year of 2015. In addition, the City of Atlanta lost 5,309 affordable rental units between 2010 and 2014, even though about 56% of residents in the Atlanta are renters (HJL & R|A, 2017). It is estimated that about 95% the rental housing units that were built from 2012 to 2014 in Atlanta were classified as luxury apartments (HJL & R|A, 2017).

The neighborhoods of Pittsburgh and Mechanicsville are one of the last few areas near the BeltLine that has affordable housing. It is not a coincidence that these two

neighborhoods experienced an increase in population by 30% of residents who earn an income below $25,000 (HJL & R|A, 2017). Mechanicsville in particular experienced a growth of Black/African-American residents moving into the area, which could be the result of displacement of residents from other nearby gentrified neighborhoods. There has also been an increase of White residents that have moved into neighborhoods south of I-20, where there has also been a rise in the median income in these neighborhoods from 2010 to 2015(HJL & R|A, 2017).

Figure 16. Property Values Surrounding the Atlanta Beltline Area (2015)



Source: Housing Justice League & Research| Action Cooperative

5.2.4. Mitigation Efforts

ABI has created policies and programs that address gentrification and the lack of affordable housing in neighborhoods near the BeltLine. An example of their policies is the utilization of inclusionary zoning to make developers to set-aside affordable housing units when building new residential rental units within the Atlanta BeltLine Overlay District (Atlanta BeltLine, 2015). ABI created the Integrated Action Plan (IAP) to layout the goals and strategies for economic development and affordable housing along the BeltLine. These goals includes diversifying funding sources, building financial sources for land acquisitions, owning and leasing land for affordable housing, and to strengthen partnerships and policies (Atlanta BeltLine, 2015). There has also been initiatives to educate homeowners on tax

exemptions and about resources for homeowners that already live in the neighborhoods near the BeltLine that either want to sell or remain in their homes (Atlanta BeltLine, 2015).

5.3. Lessons Learned from Case Studies

In both cases in Los Angeles and Atlanta, the implementation of green infrastructure such as multi-trails and greenspaces has increased property values and rental prices of housing located in nearby neighborhoods. These areas become more desirable for higher income residents; therefore, the existing residents that were used to a certain price range may get displaced and be excluded from the benefits of these green infrastructures. It is not a coincidence that many of these nearby neighborhoods were majority-minority, as these populations were historically place in areas that were deemed undesirable during segregation. The era of suburbanization caused these areas to be further neglected as cities became more concerned with economic development and attracting businesses to their downtowns. As more cities have been adapting sustainable practices to restore their natural environments and preserve their natural resources, there have been more efforts to revitalize the adjacent neighborhoods for economic purposes that benefits the overall region more than the actual communities that it will directly affect. There must be a balance between environment, economic growth, and equity. It is this reason that the history, culture, and social factors of a neighborhood is just as important to consider as the physical environment.

There were many low income residents that lived adjacent to the LA River corridor, which is similar to the residents living in West Dallas near the Trinity River corridor. These populations historically did not have many housing options due to segregation and discriminatory housing practices. Segregation has also shaped many of the historical predominantly Black/African-American neighborhoods along the BeltLine. As a result, many of these neighborhoods were settled near undesirable areas like near floodways or industrial land; however, the restoration of these places enables the development of more desirable and expensive housing. Both of these river corridors were also located near industrial areas; however, LA has lost a large portion of their industrial land and the major lead smelting factory located near the Trinity River corridor closed in the 1980s. These communities were at most risk for environmental hazards like flooding and contamination from nearby industry, but now they are the most burden from the environmental interventions to improve these previous environmental hazards.

The BeltLine has mostly attracted the development of luxury apartments, which affects the large portion of renters living in Atlanta. Homestead exemptions are not applied to renter-

occupied housing units, so there is no protection for renters when property taxes increase. The BeltLine circulates around the urban core, which means many people will lose access to job opportunities, transportation access, and other important services that the city offers to residents if they cannot afford to live within the perimeter of the BeltLine. Similarly, the Trinity River corridor is located near Downtown Dallas. These case studies reveal that the market moves at a fast pace, so it is necessary for local governments to be more proactive rather than reactionary when it comes to preserving affordable housing and preventing gentrification within their communities. There has been mitigation efforts to alleviate the effects of gentrification in these two cities, such as inclusionary housing ordinances. As other metropolitan areas start to invest more in sustainable and environmental restoration, it will be necessary for cities to be conscious of the existing housing and how the real estate market will respond to these projects. In the case of West Dallas, there still may be time to prevent gentrification in these neighborhoods.

Part 6. Planning Strategies

The following portion of this paper will offer some strategies that are available to planners and community members that are or about to experience gentrification. There are two types of strategic options that will be discussed: mitigation and prevention strategies. Mitigation strategies are examples of actions that local governments can take when there are already signs of gentrification, in order to alleviate the negative impacts of environmental gentrification. The prevention strategies are proactive ways that local governments and community members can prevent loss of affordable housing and environmental gentrification before it occurs.

6.1 Mitigation Strategies

6.1.1. Inclusionary Housing Programs

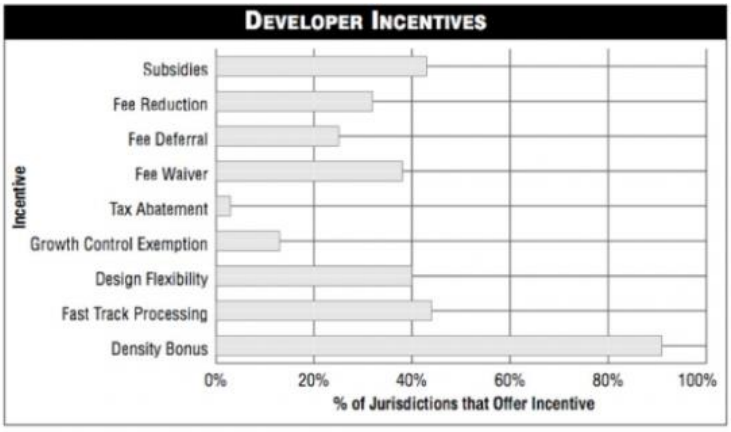
Many cities have already adopted inclusionary housing ordinances as a way to ensure there is a minimum required of affordable units within new development. Some of these ordinances may require that some amount of the increased property values be used to support the existing community. There are also many different types of inclusionary housing programs that can preserve affordable housing by using some kind of land use requirements. The following are different types of programs that can create affordable and inclusionary housing: negotiated agreements, voluntary programs, geographically target programs, and linkage programs (Grounded Solutions Network, n.d.). In the case where there are no

inclusionary housing ordinances or policies enacted within a community's jurisdiction, then there is the option for negotiated agreements with developers to provide affordable housing. These agreements would allow the developers to come up with solutions and alternatives that would benefit the community. A negotiated agreement is often times the first step towards the implementation of an inclusionary housing ordinance (Grounded Solutions Network, n.d.).

Most inclusionary housing programs are mandatory, but there are times when voluntary programs will be necessary. It allows developers to choose whether they want to develop affordable housing in exchange for receiving incentives, such as the ability to build higher density (Grounded Solutions Network, n.d.). Mandatory programs is a more effective approach that results in the creation of affordable housing, but there may be times where this is not an option if such policies are prohibited by law. Voluntary programs are appropriate during these times. Geographically Targeted Programs are inclusionary requirements for specific targeted areas, while traditional inclusionary housing requirements are applied throughout the whole jurisdiction. This is a good option for when there are only a certain neighborhoods that need more investment and development of affordable housing. These targeted areas could have a higher percentage requirement of affordable housing than the citywide requirements. Lastly, Linkage Fee Programs includes fees for "for each square foot of new market-rate construction and use the funds to pay for affordable housing" (Grounded Solutions Network, n.d.). Many communities have use this option when there are laws against rent control and inclusionary housing ordinances.

The main tool used in inclusionary housing programs is to provide incentives to developers to build affordable housing units. Figure 17 shows the types of incentives that are offer to developer and the percentage of jurisdictions that offer these kinds of incentives (Grounded Solutions Network, n.d.).The most used incentive amongst jurisdictions is density bonus, which allows developers to increase the amount of dwelling units per acre and the floor area ratio (FAR). This allows for more housing units to be built within a development site. Other frequently used incentives include tax abatements, fee waivers, and expedited permitting.

Figure 17. Types of Incentives Offered To Developers



Source: Grounded Solutions Networks website
Original Source: Non-Profit Housing Association of Northern California (2007)

6.1.2. Low-Income Housing Tax Credits

The Low-Income Housing Tax Credit (LIHTC) was created in the Tax Reform Act of 1986 by HUD to allocate funds for tax credits that provides rental housing for low-income residents. It has annual budget of $8 billion that is set-aside for state and local government agencies to use for the acquisition, rehabilitation, or new construction of affordable rental housing (HUD, 2017). The funds are allocated based on the state's population, which is administered by the state housing finance authorities (HFAs) and distributed based off the Qualified Allocation Plan (NHLP, n.d.). Developers are allow to sell or trade tax credits to investors in order to reduce debt accrued from development. Many developers offer tax credits to investors in order to gain investment in their development projects, which helps lowers financial costs for developers and ultimately allow for more affordable housing (Keightley, 2017).

6.1.3. Right-to-First Refusal Policies

In order to protect renters in neighborhoods experiencing gentrification, local governments can preserve existing affordable rental housing units by enacting a right-to-first refusal policy. A right-to-refusal in real estate gives the renter the right to come into a transactional agreement with the owner before the owner can enter into a transaction with a third party(Collett, 2011). A policy that requires owners of rental occupied housing units to

let existing residents stay in their housing that they can afford before the owner sells their unit at a higher rate to someone else. The City Council of Cambridge recently voted in favor of a right-to-first refusal bill earlier this year, which brought some controversy. Those in favor of bill wanted to prevent further displacement of existing residents, while opponents believed that property owners deserve to receive all the possible profit that the market has to offer (Levy, 2018). When the market moves faster than the community can keep up, it can lead to displacement and dismantle the community. The City Council of Cambridge plans on only targeting larger buildings with larger landlords, so that the bill will not harm owners that solely depend on the profits of a few owner-occupied housing units (Levy, 2018). The City would have to conduct extensive research, a housing market analysis, and receive public feedback before enacting such a policy.

6.2 Prevention Strategies

6.2.1 Fully Understand the Existing Community

It will take more than just identifying an area's demographics and socio-economic characteristics to fully understand the existing conditions of a community. There is an existing culture, history, and identity within these neighborhoods. Gentrification causes the displacement of community members and the disruption of this existing culture. In addition to research, regular interaction with members of this community is necessary outside of the public engagement process. The creation of relationships with community leaders of organizations such as churches, volunteer groups, local business associations, and other kinds of local associations. This includes the developers, not just the local government officials. It also might help to create a more effective public engagement process by identifying the best methods of outreach for the particular community of interest. For example, there might be many residents who are not as proficient in English or that most residents attend other local meetings at a certain day and time. This would allow the planners to prepare a public engagement process that is structured to be more inclusive and democratic. The developers should also be included in this process before the creation of the plan, so they can include the community's need into their design and site plans. The planning process tends to work slower than the developers timeline, so it is important to acquire as much information as early as possible.

6.2.2. Consider Displacement before Creating the Plan

When considering the costs and benefits of a project, the benefits of retaining the existing community and the costs of displacement should be considered. The first thing would be to look at the existing conditions of the community that would be considered as benefits, which could include things such as social services and local businesses that already exist (Mueller & Dooling, 2011). Another example would be if there is a high population of residents that do not have vehicles, which would be a benefit for a plan that included transit-oriented development or bike infrastructure. An example of costs associated with displacement would be the sprawl that displacement causes as more residents move further away from dense, urban centers. The increase of sprawl could cause future costs for public transit agencies, as they might have to expand their infrastructure due to growing demand from citizens living outside the perimeter of the city. On the other hand, it also could cause a loss of ridership for public transit agencies because these displaced residents would have to rely more on vehicles to get to work. The increase in vehicle-use within a region would create more carbon emissions, resulting in environmental and public health costs. The individual costs of displacement would include the loss of jobs, social networks, and community amenities within their existing neighborhoods (Mueller & Dooling, 2011). All of these scenarios have metrics that could be used in the calculations of a costs and benefits analysis of displacement. In addition, there should be long-term research completed on displacement to create displacement impact studies (HJL & R|A, 2017). This research would include the consequences and costs of displacement, which could ultimately provide information for future decision-makers to use.

6.2.3. More Community Participation & New Partnerships

The Center for Social Development at the George Warren Brown School of Social Work at Washington University in St. Louis, Missouri conducted Individual Development Accounts (IDAs), which included interviews with 84 low-income families from 1997 to 2003 (McBride et al, 2006). The IDAs were a part of a national policy initiative called the American Dream Demonstration (ADD). The responses comprised of the civic engagement activities that respondents reported participating in. The results showed that more than "one third of the sample discussed their involvement in their churches and congregations in

activities such as maintaining church facilities and teaching classes" (McBride et al, 2006). Many of these respondents also volunteered within their communities. The main obstacles for civic engagement that were identified during this study was the following: lack of time, issues with family care and divorce, issues with neighbors, lack of community organization, or lack of transportation (McBride et al, 2006). These results show that there is not a lack of interest for civic engagement, but rather other factors that include limited time and resources to participate in public engagement processes. The main obstacles within the neighborhoods being impacted by restoration projects should be identified and addressed. The local government can receive feedback via online surveys, email contact, and social media platforms. If the majority of resident do not have time for public meetings, then these meetings should be planned and scheduled to increase accessibility for these residents. All of this would require new partnerships with local organizations and associations for access to residents.

Community participation could also be integrated in the research process, even before the planning process has begun. The community-based participatory research (CBPR) model consists of using a research approach that involves collaboration with the community in each phase of the research process (Bates and Wiginton, 2008). In order to gain a better understanding of the community, it will be necessary to be interactive with the community rather than just being collecting and analyzing data about them. It is important to gain the trust and cooperation from the community by creating relationship with local agencies that provide services for this community; as a result, there is direct access to participating in the local fairs, forums, social events, meetings, and festivals. These type of experiences with the community in the early phase of a project can help shape and guide the planning process towards a more effective and customized to the community.

New partnerships with local nonprofits, small businesses, and community organizations could be an effective approach to reduce the threats of displacement. A community- based approach would equip planners with the right information and access to residents for more participation in the public engagement process. The plans for affordable housing and sustainability have to complement each other to prevent gentrification, so there will be have to be the creation of specific provisions that meets the requirements of that community (Pearsall and Anguelovski, 2016). These provisions will need the support of the community, as this support will justify any future proposed regulation or policies for the

preservation of affordable housing or requirements of a certain percentage of affordable housing units in new development. At the moment, it seems that public officials and planning departments are at the whim of the market and real estate developers. In a democratic process, the increase demand for affordable housing by the community should garner enough attention and support to influence public opinion. The public opinion is an important driver in policy-making.

6.2.4. More Participation from NGOs

Non-governmental organizations (NGOs) are an important component in preventing gentrification, as the local government as some limitations due to politics and bureaucracy. A community that has a strong presence of NGOs with strong leadership can make a bigger impact in the development process by amplifying the community's voices. These organizations would have to also partner with other organizations to make a bigger impact against the prevention of displacement. An example of this is the San Francisco Anti-Displacement Coalition, which consisted of twenty NGOs that fight the rights of tenants (Alvarado, et al., 2016). This type of participation amongst community members is essential in a democracy. In order to protect rights of renters and homeowners, there should be a political space for these organizations to exist. The community development and planning departments of a local government should embrace such organizations and have regular contact with them to be more connected with the community. Environmental projects must be equally community driven as well as environmentally or economically driven. At the moment, these type of projects are mostly economically and environmental driven. The private sector has more influence over public officials due to having more access to them via lobbyists and social connections. There needs to be a more democratic process that plans for all members of the community, instead for those who have the have the most power and money.

6.2.5. Reclamation of Vacant Housing

Local governments have the power to buy and sell properties, so the reclamation of vacant housing is a proactive way that municipalities can prevent gentrification in an area that is expected to redevelop. Instead of reacting to the market, local governments should anticipate gentrification and plan accordingly by securing property for affordable housing. The vacant or delinquent housing in their jurisdictions are opportunities to create more

affordable housing before the implementation of environmental enhancements such as green spaces and multi-trails. A land bank program that could acquire vacant properties would either be managed by the city or a community nonprofit organization. These properties could be converted into affordable housing that is protected from the private market (HJL & R|A, 2017). Land banks are usually used for dealing with abandoned properties that are tax-delinquent and have become a blight within a neighborhood. As of January 2018, there are about 170 land banks that exist in the United States (Center for Community Progress, n.d.). In Ohio, the Cuyahoga County Treasury created a land bank for the county that would reclaim vacant and abandoned properties, then rehabilitate them to promote housing and economic development (Hexter et al., 2008). The Cuyahoga County created the Community Improvement Corporation (CIC), also known as the Cuyahoga County Land Reutilization Corporation (LRC), to manage and facilitate the land bank. The funding for the LRC came from "penalties and interest paid on current taxes and assessments that are not paid when due" (Hexter et al., 2008). The title of the property is cleared and is to be sold after being rehabilitated "without appraisal for the amount of taxes, penalties, interest, assessments and charges against the land plus court costs (Hexter et al., 2008). A similar program that allows property to be sold to low-income households to help not increase affordable housing, but it gives the community more control over their neighborhood during redevelopment.

6.2.6. Community Land Trusts

A long-term intervention strategy against environmental gentrification is the implementation of Community Land Trusts (CLTs) in neighborhoods that need to preserve affordable housing experience. A CLT is legally defined as a non-profit corporation, which is controlled by a Board of Directors that are members of the community (Greenstein and Sungu-Eryilmaz, 2005). CLTs allows homeowners to stay in their households by maintaining ownership of the land and provides a ground lease to the homeowner (Metropolitan Council, 2017). The ground lease agreement between the CLT and homeowner will contain the rights and responsibilities of both parties in upholding this agreement. The homeowner has rights over the use of the property and to pass on the lease to another party member (Greenstein and Sungu-Eryilmaz, 2005). If a homeowner does want to sell their home, the CLT can purchase the home and find resale to someone else. If the home as appreciated, both the CLT and original homeowner will share the profits (Metropolitan Council, 2017).

There is usually a 'resale formula' included in the ground lease that balances "the interest of individual homeowners to benefit from the use of their home as a real estate investment and the interest of the CLT to provide affordable housing for future homeowners". (Greenstein and Sungu-Eryilmaz, 2005). CLTs allows the community to be have more control of their neighborhoods and protect the properties from the real estate market and market speculation, such as flipping homes. Local governments should support the formation and implementation of CLTs to preserve affordable housing and prevent displacement.

Part 7. Recommendations and Conclusion

The previous section discussed the various options of planning strategies that could be generally utilized by local government and community members. This section will provide recommended strategies that could be used in the case of West Dallas based off the research and analysis conducted in this paper. Then, the paper will conclude to provide the key takeaways and lessons from the research on environmental gentrification.

7.1 Recommendations

The Balanced Vision Plan for the Trinity River has already attracted development due to its improvement of flood protection and inclusion of environmental enhancements, which may significantly impact the historically low-income neighborhoods located along the river corridor. There is already a shortage of affordable in the City of Dallas, so environmental gentrification would displace these existing residents. The research and GIS Analysis conducted on West Dallas shows that there are no signs of displacement yet; however the demographic and economic changes detected within this area may be indicators of gentrification. The implementation of some of the prevention strategies that were previously mentioned may be more appropriate for the case of West Dallas as the mixed use development, Dallas Floodway Project, and recreational amenities from the plan are still in the process of being implemented. The case studies in LA and Atlanta demonstrated how the implementation of sustainability within their cities affected the property values of nearby neighborhoods. These two cities have already implemented mitigation strategies such as inclusionary housing ordinances and homestead tax exemptions education outreach, but the neighborhoods in West Dallas may still have time to preserve affordable housing through the previously mentioned prevention strategies.

In order to execute the prevention strategies, the community of West Dallas would need to increase civic participation and create a strong coalition of community NGOs. The local government would need the support of the public to justify any future regulations, so it is important that the community has a stronger presence and voice in this process. The residents of West Dallas have already participated in activism after the threat of being evicted from their HMK Ltd. housing. In February 2017, the tenants of HMK Ltd. partnered with the Texas Tenants' Union and the Texas Organizing Project to come up with a plan for HMK Ltd. to sell their houses to every HMK Ltd. Tenant at a reasonable price (Collins, 2017). They were successful in their efforts and many tenants were able to stay in their homes with a 20-year lease agreement. There is a strong sense of community in West Dallas and there are NGOs willing to support the community; therefore, the implementation of prevention strategies such as creating new community partnerships and CLTs could be feasible. The local government could also support this community's efforts by creating a land bank similar to the one in Cuyahoga County, Ohio. There still may be time to reclaim vacant property within the area before it can be flipped and open to the real estate market. These strategies can empower those to have more control over their own lives after a history of being neglected and disenfranchised.

Lastly, it is also important to acknowledge the diversity that exists within West Dallas. The populations that are usually referred to as minorities tend to be grouped together as one entity, when in reality there are various ethnicities and cultures within these populations. West Dallas consists of mostly Hispanic/ Latino and Black/African-American residents, whose neighborhoods are also divided from each other. The Hispanic/Latino residents will have different perspectives and needs than the Black/African-American residents and vice versa due to their different cultures and life-experiences. Therefore, it is important to reach out to the various NGOS and organizations that reflect the various ethnicities that live within this neighborhood. Overall, all participants in the planning process will have to fully understand and respect the different historical, cultural, and social components within this neighborhood to effectively building relationships and community capacity to prevent gentrification.

7.2 Conclusion

The current pattern of redevelopment and revitalization in these kind of neighborhoods ignores the history and social factors that has shaped the lives of these residents and does not necessarily make-up for the previous social injustices and negligence experienced in these areas. It is not the development itself that causes issues, but rather the exclusionary outcomes that occur due to the development. The increased development surrounding the Trinity River corridor due to the Trinity River's Balanced Vision Plan has set the motion for new higher-income residents to move into a more desirable location. It is difficult to measure gentrification in general as is natural for neighborhoods to change overtime; however, displacement becomes an apparent problem when there is a lack of affordable housing within the city and low-income residents are being shifted away further away from the city. Environmental gentrification can occur in any major city that plans to revitalize or restore their natural environment, so it is important to consider the impacts and consequences of these projects on the existing communities.

The background information on the flood management in the Dallas Floodway and the neighborhoods of West Dallas provided a historical context to the research conducted in the literature review on sustainability and environmental gentrification. Sustainability has traditionally been more focused on the environmental and economic growth for the city, while neglecting the social factors such as social justice and equity. Many low-income residents and minorities were placed in areas prone to environmental hazards like floodplains or on contaminated land located near industry. Local governments have had good intentions by implementing sustainable projects that helps to restore their natural environment and improve the quality of life for their residents; however, these environmental improvements attracts real estate activities and development that increases property values before the existing population can adjust to the new prices. These trends lead to environmental gentrification, which could ultimately lead to the displacement of the existing residents. These residents tend to be a vulnerable population concentrated in a few areas within a city due to past segregation and discriminatory housing practices.

The case studies of the LA River Revitalization and the Atlanta Beltline were examples of other large metropolitan areas experiencing gentrification due to sustainability initiatives, while the GIS analysis revealed changes in West Dallas that mirrors the changes occurred in the other case studies. All three cases included neighborhoods with a complex history and distinct culture, so active public engagement is necessary for communities such as these. The environment is public good that should be benefit all of the population, so it is important that future environmental projects are

inclusive and do not displace or exclude residents from enjoying a community amenity. The GIS analysis revealed that the median asked rent was affordable to the residents based off of the median family income within the same Census tracts in 2000. The demographic changes in West Dallas from 2000 to 2010 shows that the neighborhoods in and surrounding West Dallas were certainly minority- majority; however, by 2010 there is a much higher presence of White residents living adjacent to the Trinity River corridor and within the West Dallas neighborhoods. These changes reflect the overall trend of people moving away from the suburbs and migrating back to urban areas.. Lastly, the tax appraisal values from 2000 and 2015 show that the properties in the eastern portion of West Dallas, the area closest to the Trinity River corridor, has increased and is worth more than the areas in the western portion of West Dallas. In addition, the property values in the neighborhoods south of the West Dallas were either worth more than or the same as the properties located in the eastern portion of West Dallas. The higher tax appraisal values indicate that this area will attract more higher-income residents as the higher property taxes will not deter them and may entice more real estate activities that might exclude the existing low-income residents living there.

The planning strategies and recommendations offered solutions that could either help mitigate or prevent environmental gentrification. There is no way to control the market, but there is a way for communities to gain more control of their neighborhoods with the support of local government and NGOs. Cooperation and participation from all of these entities can ensure that sustainability benefits every member of the community and the overall environment. Local governments should keep pursuing sustainability in their future endeavors, but sustainability consists more than just the physical environment. It should also include social equity and political inclusion, as maintaining the social fabric of society is an important component in sustaining thriving and vibrant cities.

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